ESSAYS ON THE RELATIONSHIP BETWEEN THE RESEARCH ACHIEVEMENTS OF ACADEMICS AND STUDENT OUTCOMES

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Abstract

This study assesses how being taught by "research-active" university departments affects the learning of undergraduate university students. No direct measures of teaching output exist, which makes this research challenging. To overcome this challenge, I proxy for student learning with: i) a measure of student performance in coursework while controlling for high school achievement, in an effort to estimate the value added by tertiary teaching (Chapter-2) ii) student evaluations of lecturers (Chapter-3) and iii) students' labour market status (Chapter-4). I use detailed data from all New Zealand universities to investigate the effect of department/subject-specific research activity as evaluated by the Performance-Based Research Fund (PBRF) on student 'pass rates' (Chapter-2) and student labour market status (Chapter-4). Individual-level pass rates, information on labour market outcomes, and various student characteristics, are obtained from the Integrated Data Infrastructure and merged with PBRF outcomes based on each student's majoring subject. I also investigate a possible mechanism of effect by directly surveying undergraduate students in a specific department and soliciting their evaluation of lecturers (Chapter-3). Overall, my results suggest that there is no systematic difference between more research-active and less research-active university departments in terms of undergraduate student pass rates and labour market outcomes. This result is reinforced by student evaluations where highly research-active lecturers on average get very similar teaching scores to their less research-active colleagues.

Keywords: Research, University Teaching, Education Outcomes, Student Evaluations, Labour Market Outcomes.

JEL codes: I23, I26

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"Kind words can be short and easy to speak, but their echoes are truly endless." – Mother Teresa

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Table of Contents

Abstract i

Acknowledgements ii

Table of Contents v

List of Tables vii

List of Appendices viii

List of Figures ix

Stats NZ Disclaimer xii

1 CHAPTER ONE 1

1.1 Introduction 1

1.2 Conceptual Framework 3

1.3 Empirical Literature 5

1.4 Main Contributions 7

2 CHAPTER TWO 9

2.1 Introduction 9

2.2 Data 11

2.2.1 Data from the Performance-Based Research Fund 12

2.2.2 Data from the Integrated Data Infrastructure (IDI) 12

2.3 Empirical Model 20

2.4 Methods and Results 21

2.5 Alternative Model Specifications and Estimators and Subsample Analysis 26

2.5.1 Alternative Model Specifications and Estimators 26

2.5.2 Subsample Analysis 30

2.6 Conclusion 34

Appendix 2A: Aggregation and Conversion 36

Appendix 2B: Descriptive Statistics of Academics and Students; Variability in Pass Rates 51

Appendix 2C: Determinants of Student Pass Rates; Alternative Model Specifications – Tobit Estimation for PBRF Waves 2003 and 2012; OLS Estimation and Tobit Estimation without Departmental Controls 54

Appendix 2D: Determinants of Student Pass Rates; Alternative Model Specifications – Likelihood of Passing 75%, 80%, 90% and 95% of Courses (Probit Model) 66

Appendix 2E: Determinants of Student Pass Rates; Subsample Analysis – Tobit Estimation for Students' Gender, Decile and Subject Groups 78

Appendix 2F: Determinants of Student Pass Rates; Subsample Analysis – Tobit Estimation for Minimum 3 EFTS Attempted; Balanced 2003 and 2012 Sample Size; Subject Area excluding Education; NCEA Level Achieved and Student's Ethnicity 105
Appendix 2G: Supplementary Figures 135
Appendix 2H: Supplementary Graphs 137
3 CHAPTER THREE 139
3.1 Introduction 139
3.2 Survey Design 140
3.3 Data 143
3.4 Empirical Model 146
3.5 Methods and Results 147
3.6 Conclusion 153
Appendix 3A: Approval Letter by Human Ethics Committee 154
Appendix 3B: Screenshots of the Full Survey 155
Appendix 3C: Online Consent Form 163
Appendix 3D: Calculation of Research Score 164
4 CHAPTER FOUR 173
4.1 Introduction 173
4.2 Background 174
4.3 Data 180
4.4 Empirical Model and Methods 184
4.5 Results 185
4.6 Sub-sample Analysis 187
4.7 Conclusion 191
Appendix 4A: Baseline Model 192
Appendix 4B: Marginal Effects of Multinomial Logit for two PBRF Waves 213
Appendix 4C: Marginal Effects of Multinomial Logit for Student's Gender 237
Appendix 4D: Marginal Effects of Multinomial Logit for Student's Ethnicity 261
5 CHAPTER FIVE 305
6 References 308

List of Tables

Table 2.1 Correlation Matrix between PBRF Rank and Researcher's Position Title 17
Table 2.2: Difference in the number of students in the two cohorts 19
Table 2.3 Determinants of Student Pass Rates; Baseline Model (Tobit) 24
Table 2.4 Determinants of Student Pass Rates; Alternative Model Specifications and Estimators 28
Table 2.5 Determinants of Student Pass Rates; Alternative Model Specifications and Estimators: Probit Model 29
Table 3.1: Respondents' Characteristics 144
Table 3.2: Mean Student Evaluation Scores (anonymized) 144
Table 3.3: Number of each type of publications of all Economics & Finance UC academics (anonymised) 146
Table 3.4: Tobit and OLS Regression Results 151
Table 3.5: Standardised Effect sizes of Relationship between Research Scores and Student Evaluation Scores 152
Table 4.1: Alignment of Cohorts with the Sixth Tax Year 175
Table 4.2: Number and Proportion of Students in Different Income Thresholds 177
Table 4.3: Status Matrix 183
Table 4.4: Descriptive Statistics of Students 183
Table 4.5: Determinants of Labour Market Outcomes; Baseline Model 186
Table 4.6: Determinants of Labour Market Outcomes; Subsample Analysis 187

List of Appendices

Table 2.A.1: Aggregating Position Title of Academics....36
Table 2.A.2: Aggregating NCEA Variable....44
Table 2.A.3: Merging Students' Fields to PBRF Subject Areas....44
Table 2.A.4: Aggregation of Subject Areas....50
Table 2.B.1: Descriptive Statistics of Academics....51
Table 2.B.2: Descriptive Statistics of Students....52
Table 2.B.3: Variability in Pass Rates....53
Table 2.C.1: Determinants of Student Pass Rates; Alternative Model Specifications – PBRF Wave 2003 (Tobit)....54
Table 2.C.2:Determinants of Student Pass Rates; Alternative Model Specifications – PBRF Wave 2012 (Tobit)....57
Table 2.C.3: Determinants of Student Pass Rates; Alternative Model Estimators – OLS Model....60
Table 2.C.4: Determinants of Student Pass Rates; Alternative Model Specifications (Tobit Model without Departmental Controls)....63
Table 2.D.1: Determinants of Student Pass Rates; Alternative Model Specifications and Estimators: Likelihood of passing 75% of the courses (Probit Model)....66
Table 2.D.2: Determinants of Student Pass Rates; Alternative Model Specifications and Estimators: Likelihood of passing 80% of the courses (Probit Model)....69
Table 2.D.3: Determinants of Student Pass Rates; Alternative Model Specifications and Estimators: Likelihood of passing 90% of the courses (Probit Model)....72
Table 2.D.4: Determinants of Student Pass Rates; Alternative Model Specifications and Estimators: Likelihood of passing 95% of the courses (Probit Model)....75
Table 2.E.1: Determinants of Student Pass Rates; Subsample Analysis (Student's Gender – Male)....78
Table 2.E.2: Determinants of Student Pass Rates; Subsample Analysis (Student's Gender – Female) 81
Table 2.E.3: Determinants of Student Pass Rates; Subsample Analysis (Student's High School Decile 1, 2 and 3)....84
Table 2.E.4: Determinants of Student Pass Rates; Subsample Analysis (Student's High School Decile 4, 5 and 6)....87
Table 2.E.5: Determinants of Student Pass Rates; Subsample Analysis (Student's High School Decile 7, 8, 9 and 10)....90
Table 2.E.6: Determinants of Student Pass Rates; Subsample Analysis (Subject Area – Humanities) .93
Table 2.E.7: Determinants of Student Pass Rates; Subsample Analysis (Subject Area – Natural Sciences)....96
Table 2.E.8: Determinants of Student Pass Rates; Subsample Analysis (Subject Area – Professions) .99
Table 2.E.9: Determinants of Student Pass Rates; Subsample Analysis (Subject Area – Social Sciences)....102
Table 2.F.1: Determinants of Student Pass Rates; Subsample Analysis (Minimum 3 EFTS Attempted)....105
Table 2.F.2: Determinants of Student Pass Rates; Subsample Analysis (balanced 2003 and 2012 sample size)....108
Table 2.F.3: Determinants of Student Pass Rates; Subsample Analysis (Subject Area excluding Education)....111
Table 2.F.4: Determinants of Student Pass Rates; Subsample Analysis (NCEA less than level 3 achieved)....114
Table 2.F.5: Determinants of Student Pass Rates; Subsample Analysis (NCEA Level 3 Achieved) 117

Table 2.F.6: Determinants of Student Pass Rates; Subsample Analysis (Overseas Equivalent NCEA Level 3 Achieved) 120
Table 2.F.7: Determinants of Student Pass Rates; Subsample Analysis (NCEA Missing) 123
Table 2.F.8: Determinants of Student Pass Rates; Subsample Analysis (Student's Ethnicity – NZ European/Pākehā) 126
Table 2.F.9: Determinants of Student Pass Rates; Subsample Analysis (Student's Ethnicity – Asian) 129
Table 2.F.10: Determinants of Student Pass Rates; Subsample Analysis (Student's Ethnicity – NZ Māori) 132
Table 3.D.1: Calculation of Research Score 164
Table 4.A.1: Determinants of Labour Market Outcomes; Baseline Model 192
Table 4.A.2: Determinants of Labour Market Outcomes Baseline Model 204
Table 4.B.1: Determinants of Labour Market Outcomes 213
Table 4.B.2: Determinants of Labour Market Outcomes 225
Table 4.C.1: Determinants of Labour Market Outcomes; Subsample Analysis 237
Table 4.C.2: Determinants of Labour Market Outcomes; Subsample Analysis 249
Table 4.D.1: Determinants of Labour Market Outcomes; Subsample Analysis 261
Table 4.D.2: Determinants of Labour Market Outcomes; Subsample Analysis 272
Table 4.D.3: Determinants of Labour Market Outcomes; Subsample Analysis 283
Table 4.D.4: Determinants of Labour Market Outcomes; Subsample Analysis 294

List of Figures

Figure 1.1: Research Design 2
Figure 3.1: Scatter Diagram Showing Relationship between Research Score and Organisation of Classes/Sessions 149
Figure 3.2: Scatter Diagram Showing Relationship Between Research Score and Lecturer's Attitude 149
Figure 3.3: Scatter Diagram Showing Relationship Between Research Score and Knowledge of Content 150
Figure 3.4: Scatter Diagram Showing Relationship Between Research Score and Usage of Topical Examples in Class 150
Figure 4.1: Flowchart showing the algorithm to categorise students into labour market states. Students get assigned a unique status in the sixth year after they enrolled in a formal Bachelors/STAR programme 179
Figure 4.2: Data Sources 184

List of Abbreviations

Abbreviation	Explanation
ACC	Accident Compensation Corporation
AQS	Average Quality Score
AUT	Auckland University of Technology
CLC	Central Linking Concordance
EFTS	Equivalent Full Time Student
EMS	Employer Monthly Schedule
EP	Evidence Portfolio
ERI	External Research Income
FSTC	Family Support Tax Credit
GPA	Grade Point Average
IDI	Integrated Data Infrastructure
IR	Inland Revenue
MOE	Ministry of Education
MSD	Ministry of Social Development
NCEA	National Certificate of Educational Achievement
NE	New and Emerging Researchers
OLS	Ordinary Least Squares
PBRF	Performance-Based Research Fund
PPL	Paid Parental Leave
QC	Quality Category
QE	Quality Evaluation
SE	Standard Error
STAR programme	Secondary Tertiary Alignment Resource programme
TEC	Tertiary Education Commission
TEO	Tertiary Education Organisation

UC	University of Canterbury
WHP	Withholding Tax Deducted Payments

Stats NZ Disclaimer

Disclaimer for output produced from Stats NZ surveys or Census data

Access to the data used in this study was provided by Stats NZ under conditions designed to give effect to the security and confidentiality provisions of the Statistics Act 1975. The results presented in this study are the work of the author(s), not Stats NZ or the Ministry of Education.

Disclaimer for output produced from the IDI

These results are not official statistics. They have been created for research purposes from the Integrated Data Infrastructure (IDI) which is carefully managed by Stats NZ. For more information about the IDI please visit https://www.stats.govt.nz/integrated-data/.

Disclaimer for Inland Revenue tax data

The results are based in part on tax data supplied by Inland Revenue to Stats NZ under the Tax Administration Act 1994 for statistical purposes. Any discussion of data limitations or weaknesses is in the context of using the IDI for statistical purposes and is not related to the data's ability to support Inland Revenue's core operational requirements.

CHAPTER ONE

1.1 Introduction

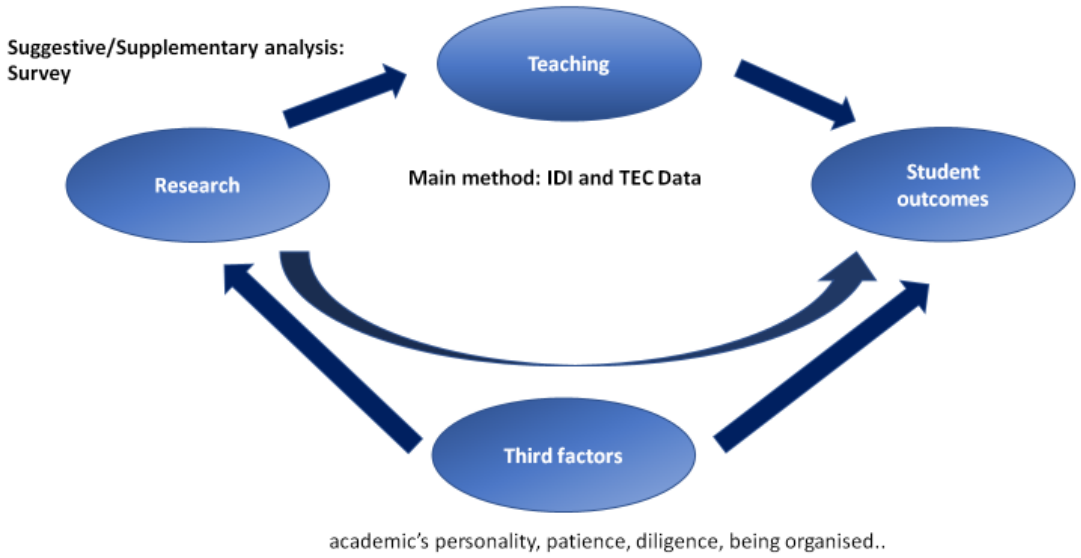
The relationship between research and teaching is a topic of particular interest in higher education. If nothing else, knowing whether a link between teaching and research exists has important implications for how universities are funded. Given that the New Zealand Tertiary Education Commission (TEC) spends $1.8 billion on universities, the potential budgetary implications are large (Tertiary Education Commission, 2020). One manifestation of the claimed link between research and teaching, which underpins how universities are funded and organised, is the emphasis on what is termed research-informed teaching. The concept of research-informed teaching is stated clearly in the Education Act 1989, section 162, subsection 4(a)(ii) and within universities (Ministry of Education n.d., Universities NZ – Te Pōkai Tara 2019). The underlying belief is that teaching is positively affected by the research activities of academics. However, theoretical, and empirical studies find that the existence, or the sign of this link, is not so clear (Quiggin 2004; Hughes 2004; Docherty 2010; Epstein and Menis 2013).

The existing literature generally focuses on a single university while linking research and teaching quality (Palali, Elk, Bolhaar, & Rud, 2018). In contrast, I can conduct a national analysis as I use student-level data for all Bachelor students studying at the eight universities in New Zealand. I use Integrated Data Infrastructure (IDI) database which provides information on all students in New Zealand. I use Performance-Based Research Fund (PBRF) assessments which I have obtained from the Tertiary Education Commission, New Zealand to measure the research productivity of academics teaching at these universities. The PBRF grades provide a uniform measure to assess the research contributions of all academics. This uniformity allows me to link these two datasets at the national level. I merge the IDI student outcomes with PBRF research outcomes of the academics according to subject areas (as proxies for departments) as my final dataset with which I can conduct my statistical analysis (Chapter-2 and Chapter-4). I also investigate a possible mechanism of effect by conducting

student evaluations of their teachers in a single department at a New Zealand university (Chapter-3).

My research contributes to the existing literature and is novel in two ways. First, I shed some light on the full chain of relationships between research, teaching and student learning, and subsequent student outcomes (see Figure 1.1). Second, I use national data for studying the relationship between research and teaching quality rather than focusing on a single university.

Figure 1.1: Research Design



My study aims to analyse whether research-active departments produce better teaching outcomes for students. Since it is difficult to measure teaching quality, I use several alternative proxies: students' university achievement (Chapter-2), their evaluations of lecturers (Chapter-3) and their subsequent labour market outcomes (Chapter-4). This research may affect how New Zealand universities allocate funding to research activities and teaching and decide on promotion policies of academics and curriculum design.

1.2 Conceptual Framework

In theory, the effect of research activities of academics on student outcomes is ambiguous. On the one hand, it is possible that research activity has a positive impact on teaching outcomes. For example, undertaking research might boost critical thinking skills of academics, making them more productive (Healey, 2005). As a result, even if they have to divide their limited time and resources between research and teaching, research makes them more productive teachers. As a result, they need less time to prepare for lectures, instructional materials and so forth. Moreover, they can incorporate up-to-date information in their lectures and hence make classes more interesting, facilitating learning by students. The fact that research-active staff can relate theoretical knowledge with real-world applications can appeal to the curiosity of their students, building their passion towards the subject and their field. This can enhance attendance rates and the attentiveness of students, and thus increase their overall learning experience (Elton, 2001). This, in turn, may improve their university and subsequent outcomes. Being taught by active researchers may also impart various transferrable skills to students: for instance, problem-solving skills, being organised, being goal-oriented, and being diligent. Research-active staff have the potential to provide an opportunity for their students to assist them in their projects, thus broadening their students' horizons which might increase their employability. All of these factors can play a major role in influencing student accomplishments in and beyond university.

On the other hand, it is possible that the more research an academic does, the worse are his/her students' teaching outcomes (Ramsden and Moses 1992, Bak and Kim 2015). Since academics are required to perform both research and teaching (and service) at the university level, they need to choose how much of their scarce time and effort to expend on these activities. If academics spend more time on research, then they may spend less time teaching students, particularly undergraduate students. For example, research-busy academics might give less personal attention to students because of their research commitments. They might also delegate some of their responsibilities to less experienced and knowledgeable teaching assistants or reduce teaching effort and time by using outdated teaching materials. The choice to substitute research effort for teaching effort is due to the opportunity cost that spending

time on teaching has in terms of lost research output. Since the modern university system places a high emphasis on university rankings, and rankings are largely determined by research output, universities may reward research more than teaching (Grunig 1997). Consequently, the opportunity cost of time and effort spent teaching is high in terms of the rewards from research.

Yet another possibility is that being educated in a research-active department/university helps students but not necessarily via teaching. For example, an organisation doing more research may be more difficult for low ability students to be admitted into or to successfully complete a qualification at, and thus actually coming out with a qualification signals that the student is a high ability student even if the education itself did little to enhance his/her abilities. Possession of a degree rather than years spent leading up to a qualification may signal the pre-existing abilities and productivity (sheepskin effect) and hence, impact the hiring decisions of employers (Gibson, 2000). This signalling effect was first noted by Arrow (1973) who explained that higher education is used as a "screening device" by the buyers of labour. These findings are reinforced by Belman and Heywood (1997) who establish that degrees signal the productivity of labour. Moreover, better researchers can write more influential reference letters for their graduates and thus place them in better jobs. Finally, since research attracts money, a research-active department/university might have better resources and facilities such as student support services and infrastructure, which can improve student achievement. For this reason, undergraduate degrees can act as primary *signals* of students' abilities while teaching and, by implication, the amount of research output produced by their university lecturers may have no *direct* impact on students' outcomes.

In order to address the gaps in the previous mixed literature, in my thesis, I estimate the reduced-form (total) effects of academics' research achievement on student outcomes – be it directly via teaching or indirectly via channels such as signalling, money, or power. However, I try to minimise the influence of indirect channels by including university, subject and year fixed effects in my model.

1.3 Empirical Literature

The existing empirical literature provides mixed evidence about the effects of research on teaching with some studies finding a positive link, others a negative one, and some suggesting that the two scholarly activities are largely independent. Some evidence also suggests that the relationship between teaching and research differs across disciplines, the level of study, workload allocations, faculty-student ratios, and institutional settings (Smeby, 1998).

Neumann (1992), who conducted a qualitative analysis of Australian universities, found that research and teaching positively influence each other, describing three types of connections between the two: tangible – relating to the transmission of current facts and cutting-edge knowledge; intangible – relating to the arousal of both students and faculty in the process of learning; and global - when this nexus influences the entire department, not just the individual academic. A positive, bi-directional interdependence was established by Smeby (1998) whose study was based on survey data and interviews of university staff from four Norwegian universities. Wood and DeLorme Jr (1976) found a positive link between research output and teaching ratings at a large university in the United States. Some studies from New Zealand (Robertson & Bond, 2005) and Australian universities (Neumann R. , 1994) concluded that postgraduate students benefit more from research-active academics than undergraduate students, the latter suffering because of staff unavailability. J M Consulting (2000) reported that the interaction between teaching and research is more direct in the Humanities than in the Sciences at the undergraduate level, for UK universities, while teaching and research correlate more in the Sciences than Humanities at the postgraduate level. Palali, et al. (2018), who use publication records as a measure of research quality and student grades and student evaluations as measures of teaching quality, find that the quality of publications impacts the grades of Masters students positively but the quantity of them has no effect. They find that publication quality has a different impact on student evaluations. In particular, Masters students do not score teachers with high quality or quantity of publications higher than those with lower amounts of both. This finding is reinforced by even lower scores given by Bachelor students evaluating teachers who are active researchers. Artés, Pedraja-Chaparro and

Salinas-JiméneZ (2016) find a non-linear, positive relation between research performance and teaching quality, which they measure by teaching evaluations for the University of Extremadura, Spain. Rodríguez and Rubio (2016) whose study is also based on a Spanish public university, find a weak but a positive and significant relationship between top publications and teaching quality, where teaching quality is computed using a value-added methodology. In Britain, the belief that higher education teaching should take place in a research environment (Smeby, 1998) is potentially shown by the fact that research universities are better funded and have more favourable staff-student ratios. While the literature has suggested that teaching may benefit from research, this positive link may also work in the reverse direction, as recognised by Becker and Kennedy (2005). This relationship is supported by Mankiw (1998), Newby (1999), and Jenkins and Healey (2005) who all argue that critical thinking and new ideas are sparked in researchers through direct contact with students while preparing lectures, the act of teaching students and answering questions from students related to the course.

Since research and teaching compete with each other for staff time and availability (the scarcity model), a negative relationship between the two activities is highlighted by Clark (1997) and Boyer (1987, 1990). Ramsden and Moses (1992) also established that the quantity of research output has a small negative correlation with the quality of teaching. McNay (1998) who studied the impact of the Research Assessment Exercise (RAE) in the UK supported no link between research and teaching. He noted that one of the reasons for no link between the two activities was that more research-active staff spent less time on undergraduate teaching as doing more research was likely to be more rewarded. Ramsden et al. (1995) noted that quality research rather than teaching is taken into consideration in promotion decisions which is why staff prioritise research over teaching.

A null association between research and teaching of academics was shown by Hattie and Marsh (1996) and Feldman (1987). Hattie and Marsh (2004) conducted a meta-analysis of 58 studies and found no association between research and teaching at the individual or department levels. However, they did not recommend that these activities should be separated for funding purposes but rather emphasized strengthening the research-teaching nexus by the means of appropriate rewards. To support their argument, they reported that

although the mission statement of one of New Zealand's universities focused on the link between research, teaching, and professional service, it was hardly executed in most universities. An absence of a relationship between research productivity and teaching effectiveness was also established by Melland (1996). His study was based on questionnaires surveying sixty Bachelor nurse educators to capture the research and teaching productivity for the University of Minnesota in the United States.

1.4 Main Contributions

As just discussed, there is an extensive literature available studying the link between research productivity and teaching quality. Despite a large number of studies devoted to this topic, there has not been a consensus among researchers on the size nor even the sign of this effect. A limited number of studies have also investigated the link between teaching quality and subsequent student outcomes (Braga, Paccagnella and Pellizzari 2016). However, the full chain of relationships between research productivity and teaching quality in turn affecting students' labour market outcomes needs more exploration. In my thesis, my objective is to bridge this gap by studying the impact of the research carried out by academics on (1) the outcomes of their students while at university (Chapter-2); (2) students' evaluation of lecturers (Chapter-3); and (3) students' longer-term, labour market outcomes (Chapter-4).

My primary research question is: "Does the fact that academics do research improve the outcomes of their students?" My thesis provides new empirical evidence on the following competing hypotheses:

1. Research-active academics contribute positively to student outcomes via better teaching or through other channels (for instance, better researchers attract more resources to the department helping students succeed; better researchers can write more influential reference letters for graduates and thus place them in better jobs and so on);

2. Research-active academics contribute negatively to student outcomes; for example, research displaces teaching (a plausible reason being the presence of trade-off between time and effort spent on two activities by the academics);
3. Mechanisms 1 and 2 above offset each other, or undergraduate degrees are primarily signals of students' pre-existing ability, and the research-teaching nexus thus has no causal effects. I proxy for students' pre-existing ability by including two measures of their academic history: high school achievement (as assessed by the National Certificate of Educational Achievement, NCEA) and high school decile[1].

Overall, my study adds to the debate on the relationship between research and teaching outputs. Knowing more about this relationship would give information to individual universities about how to best organise their resources; for example, should they require their academics to research if they are to teach, or should they have specialist teachers and specialist researchers? This is more commonly witnessed in other developed nations but is rare in New Zealand. Knowing how being research active affects teaching outcomes is needed to help make these decisions. This, in turn, has implications for how the government structures higher education in NZ. This could be separating research funding from teaching funding or maintaining the status quo where combining research and teaching is encouraged. In an extreme case, it could be that the government creates a system where there are research-only universities for PhD and Masters students and teaching-only universities for undergraduate and taught Masters students.

[1] In New Zealand, deciles are a measure to rank schools on the basis of various socio-economic indicators such as household income, parents' educational qualification, employment status, occupation and whether they receive benefit support from the government. Schools are ranked from decile 1 to 10, where decile 1 schools have a high proportion of students with lower socio-economic background and decile 10 schools have a high proportion of students with higher socio-economic background.

CHAPTER TWO

2.1 Introduction

In this chapter of my thesis, I study the link between research-active New Zealand university departments and the university achievement of their students. In this particular chapter (and again later in Chapter-4), my measure of research achievement of academics/departments is the evaluations conducted as part of the national Performance-Based Research Fund (PBRF) Assessment.

PBRF, introduced in 2003, is a New Zealand government initiative which has the aim of encouraging excellence in research at the tertiary education organisations in the country. The PBRF mechanism allocates some of the university funding based on the quantity and quality of research conducted by the TEOs as measured by evaluation panels - instead of the level and pattern of student demand as occurs with the other components of university funding. Thereby, PBRF intends to promote quality, research-informed teaching.

Specifically, three measures form the final PBRF score: Quality Evaluation (QE; 60% weight during my sample period), Research Degree Completions (25%), and External Research Income (15%)[2]. My research focuses on the Quality Evaluation component of the PBRF only. Four QE rounds have been conducted so far – in 2003, 2006, 2012 and 2018. I restrict my study to two rounds – 2003 and 2012. I exclude the 2006 evaluation which was a partial round only, meaning that academics did not have to submit their research portfolios and generally only did so if they did not submit a portfolio in 2003, wanted to (re)submit their portfolio in a different subject area, or wanted their portfolio to be reassessed (Tertiary Education Commission, 2007). The 2018 round was still in progress at the time of my research, hence, my study does not include it. The expert peer review panel of each relevant discipline assigns a Quality Category (QC) to each academic in that discipline on the basis of the assessment of the Evidence Portfolios (EP) submitted by them. In order to be assessed,

[2] These weights have recently changed. Specifically, from 2016, Quality Evaluation gets a weight of 55%, Research Degree Completion 25% and External Research Income 20% (Tertiary Education Commission, n.d.).

the academics were expected to include information about three categories in their Evidence Portfolios before the 2018 round: 'research output', 'peer esteem' and 'contribution to research environment' (Buckle & Creedy, 2018). Quality Category is essentially an alphabetical grade which is assigned after the assessment of the academics' portfolios on the basis of the three categories and has four grades – A, B, C and R; A being the highest ranked and R being the lowest ranked. Additional C(NE) and R(NE) categories where NE stands for New and Emerging researchers were introduced in the 2006 PBRF wave in recognition of the time it takes for new researchers to establish their work and reputation in their academic field. Apart from these Quality Categories, I also include "Evidence Portfolio not submitted" as another category to acknowledge that not all academics submitted their portfolios in the 2003 PBRF wave. Based on their research performance, every university department is assigned Average Quality Scores (AQS) at the termination of each PBRF round. These scores determine how the PBRF funding is allocated.

Although PBRF assesses individual academics, for the purposes of my research, I aggregate the data provided by the PBRF team according to the 42 subject areas taught at the eight New Zealand universities for the two PBRF waves, where a subject area serves as a proxy for a department. Although the PBRF mechanism is a very comprehensive and a uniform system for measuring the research performance of academics, Buckle & Creedy (2018) recognise some drawbacks of the PBRF system. They point out that it is complex and creates an incentive to act strategically and behave opportunistically so as to increase measured output without actually increasing output. For instance, universities can hire and fire academics depending on their research calibre and can manipulate the contracts of the eligible staff (KPMG, 2012) in order to spike the scores achieved by them with the aim of attracting more funds. They propose various alternative measures of research performance and argue that the government should revisit the PBRF metrics in the light of different approaches followed in other countries and the experience from the PBRF waves that have been conducted so far.

In this chapter, I measure student outcomes as the short-term achievement while studying at the university. I use the Integrated Data Infrastructure (IDI) database provided by Stats NZ

in order to study student accomplishment. Unfortunately, since information on the GPA of each student is unavailable, I construct a *pass rate* measure. This measure ranges from 0 to 100. I define it as follows:

$$pass\ rate = \frac{\text{total EFTS of successfully completed courses}}{\text{total EFTS of the courses taken by a particular student}}$$

where EFTS (Equivalent Full Time Student) is a measure of study workload in New Zealand.[3] After doing this, I merge the department-level PBRF outcomes dataset with the student-level dataset and use this to conduct my statistical analysis. My study does not find a significant relationship between the achievement of the research-active departments and student *pass rates*.

The remainder of this chapter is organised as follows: Section 2.2 details the characteristics of both the PBRF dataset received from the Tertiary Education Commission and the tertiary education dataset provided via the IDI. Section 2.3 specifies my empirical model and Section 2.4 discusses the major findings of my work. Section 2.5 examines alternative model specifications and estimators and includes subsample analyses. Finally, Section 2.7 summarises and concludes the paper.

2.2 Data

As mentioned above, I use two primary sources of data for Chapter-2. These are the Performance-Based Research Fund (PBRF) assessments of university academics provided by the Tertiary Education Commission and the Integrated Data Infrastructure (IDI) database maintained by Stats NZ which includes data on tertiary students.

[3] Commonly, 15 points or credits are equivalent to 0.125 EFTS. An undergraduate course is often worth 15 points.

2.2.1 Data from the Performance-Based Research Fund

PBRF, introduced in 2003, is a New Zealand government initiative which aims to enhance excellence in research at tertiary education organisations (TEOs) in the country. To do that, PBRF comprehensively assesses – and allocates funding based on – the quantity and quality of research conducted by each academic, and other indicators of research performance of each TEO as a whole. Tertiary Education Commission is the government organisation that monitors the performance of tertiary education organisations. TEC allocates their funding and gives information and advice to the New Zealand government about the TEOs' performance. To obtain a measure of research performance for all academics/academic departments in New Zealand, I rely on data from the Performance-Based Research Fund assessment. The PBRF team at the Tertiary Education Commission, New Zealand provided me with an anonymized dataset of individual academics at all the tertiary education institutes in New Zealand who submitted evidence portfolios in the three PBRF waves covered by my sample period – 2003, 2006 and 2012. However, I restrict my analysis to the two PBRF waves of 2003 and 2012 as discussed above. This dataset is not available publicly and was provided to me under a confidentiality agreement. The 'raw' PBRF dataset contains information about each researcher's PBRF grade, subject area, position title, and demographics such as the age bracket, gender, and ethnicity. As an aggregate measure of research performance, I use the numbers and proportions of academics belonging to each PBRF Quality Category (i.e., PBRF letter grade) in each academic department.

2.2.2 Data from the Integrated Data Infrastructure (IDI)

The Integrated Data Infrastructure database is a large database developed by Stats NZ which comprises confidentialised microdata about people and households. It includes information on education outcomes (such as those used in this thesis), tax and welfare records, health and criminal records, Census data, and other administrative records of New Zealanders. The data including both administrative and survey data is collected from different government agencies, Stats NZ surveys, and non-government organisations (Appendix 2G). This data is

then linked by a unique identifier and anonymised so that any information that can identify individuals is encoded.

Stats NZ have strict measures in place before a researcher or an official can gain access to the integrated data. Researchers need to submit a detailed application, pass referee checks, and attend confidentiality training to get access to the IDI data. In order to ensure the safety of the data, the integrated data can only be accessed in a secure virtual environment at computers based in Stats NZ Data Labs which are set up in various cities around New Zealand. Moreover, the IDI team checks all research results before they are released to maintain the confidentiality of individuals.

In this chapter, I use the tertiary education data in IDI which covers all the students enrolled for formal tertiary qualifications in all the tertiary education organisations (that receive government funding) in New Zealand from 1994. Specifically, I use course and enrolment datasets for my analysis. The PBRF assessments obtained from TEC and linked with the IDI data allow me to test the relationship between research and student outcomes, be it via teaching or not. The population studied consists of all students pursuing undergraduate degrees from a New Zealand university.

To analyse student outcomes while at university, I have used two IDI datasets provided by Stats NZ. These are course and qualification enrolment datasets. The course dataset includes over 59 million[4] observations of the courses taken by students from tertiary education institutes in New Zealand from 1994 till present. This dataset includes information about each student's level of study, courses taken, course completion status (successful vs. unsuccessful), the weights of courses (EFTS), and several background characteristics such as the student's nationality, ethnicity, age, gender, last high school deciles and the highest secondary qualification.

[4] The numbers of observations reported in this thesis are approximate to satisfy Stats NZ privacy clause 4.1.3.

To obtain a more homogenous sample, I have restricted the course providers to only universities and have dropped various other tertiary education organisations such as institutes of technology and polytechnics, wānanga, and private training establishments. Another reason for this restriction is that universities are where the bulk of research is done and where the research-teaching link is emphasized. This led to a drop in the number of observations to around 16 million. Further, I have limited the qualification type to formal (greater than 0.03 EFTS) or STAR[5] (Secondary Tertiary Alignment Resource programmes), thus excluding formal short courses and non-formal programmes. Since I study the effect of research as assessed by the 2003 and 2012 PBRF waves, I have taken the first year at the tertiary institution to be 1998/1999 or 2007/2008, allowing for three or four years of study to be completed by 2002 and 2011 (corresponding to the two Quality Evaluation waves of PBRF in 2003 and 2012, respectively). Additionally, I have confined the sample to only Bachelors and STAR students who are residing in New Zealand and intramural students as they are most likely to be directly exposed to the academics in a department. I have restricted my sample to students who have attended secondary school in New Zealand. This is done by checking whether the information about the school decile code or the school number for the last school attended prior to enrolment in the university was given in the IDI. I have made this restriction to better approximate the value added by university study. Next, I have only included those courses for which a withdrawal date was not given and allowed the courses to be either completed successfully or unsuccessfully. Only completed courses count towards a qualification. I also checked for discrepancies in data related to non-matching values for the variable gender and birth year. I excluded the students from my dataset for whom I found a discrepancy. I calculated a student's age at entry to university as the difference between their first year at a university and their birth year. This variable may serve as a proxy for a student's maturity and experience at the start of their university education.

As a next step, I have restricted the sample to those students for whom total EFTS of courses taken is at least 80% full-time. This is because part-time students take more time to complete a qualification and hence are 'out of sync' with the pre-PBRF cohorts. My measure of student

[5] The STAR programme is designed for Year 12 and 13 secondary (i.e., high school) students in New Zealand to enroll for first-year university-level courses.

achievement at university (and in the absence of course grades) is a measure called *pass rate* which I have constructed as the proportion of total EFTS of successfully completed courses out of the total EFTS associated with the courses taken (i.e., attempted) by each student. After making these restrictions and calculating the *pass rate* variable, I next converted the course level data to student level data resulting in a dataset consisting of around 79,000 students. Approximately 5% of the students in my sample have taken 0-5 courses, 13% have taken 15-20 courses and 26% have taken 20-25 courses (please refer to Appendix Figure 2.H.1). To recognise the fact that pass rates are observed more precisely when based on a larger number of courses attempted, I weigh (using *aweight* in Stata) all my analyses by the total EFTS associated with the courses taken by each student. As expected, the majority of the students in my sample are between 17-24 years of age (please refer to Appendix Figure 2.H.2).

I next merge the dataset consisting of students with the dataset consisting of researchers, by their common subject area, which acts as an indication for departments. In the student dataset, 'subject area' is based on the student's predominant field of study. The Ministry of Education have a sophisticated method of determining students' main field (Ministry of Education, 2017) and I use their classification for my subject area proxy. In simple terms, a student's main field is the field in which the student has taken most of their courses/EFTS. Since the assigned main field changes dynamically as students progress through their studies, I keep the last record of the students' predominant field of study. Restricting my sample to students for whom information on the main field of study is available gives me a final sample of over 60,000 students.

In order to classify academics and students into comparable subject/field categories, I have aggregated students' main fields into the 42 PBRF subject areas (please refer to Appendix 2A). After doing this, I have merged the student sample (from IDI) with the academics' sample (from TEC) based on TEO name (i.e., university), subject area and the PBRF evaluation year. Students for whom the first year at the university was 1998/1999 were matched with the 2003 PBRF wave academics and students starting university studies in 2007/2008 were matched with the academics submitting portfolios in the 2012 PBRF wave.

Appendix Table 2.B.1 summarises the descriptive statistics of the academics. As shown in this table, the percentage of researchers achieving A and B scores nearly doubled between 2003 and 2012. The percentage of academics who received the lowest grade, R, has dropped significantly from the first PBRF wave (>15%) to the last wave (~4%). One of the contributing factors may be the promotion of academics, with the proportion of Professors and Associate Professors increasing substantially over this period. Another cause may be the exit of low research active staff and entry of high research active staff in NZ universities. The percentage of female researchers was substantially lower than male researchers in both PBRF waves. However, a declining gap is witnessed between 2003 and 2012 (Appendix Table 2.B.1). As shown in Appendix Table 2.B.1, the large majority of academics are of European/Pākehā descent followed by smaller groups of Māori and Asian academics. However, it is worth noting that many academics have not reported their ethnicity which they are entitled to do.

Table 2.1 shows the correlation statistics for the PBRF grades and position title of the academics. As depicted in this table, the sign and direction of the correlation coefficients confirm the intuition. For example, Professors are more likely to have PBRF rank A than Associate Professors. At the same time, since the correlation coefficients are not high, this shows that academics' PBRF outcomes and position titles are not perfect predictors for each other. For instance, an academic attaining PBRF rank A is not necessarily a Professor. PBRF rank B is also quite common among Professors. Therefore, I have included both as independent variables in my model.

Table 2.1 Correlation Matrix between PBRF Rank and Researcher's Position Title

	Professor	Associate Professor	Senior Lecturer	Lecturer	Other Teaching Staff	Other Non-teaching Staff
Proportion of academics attaining PBRF rank A	0.4134	0.2949	-0.2515	-0.154	-0.0771	-0.047
Proportion of academics attaining PBRF rank B	0.3269	0.4297	0.0559	-0.2725	-0.2912	-0.1563
Proportion of academics attaining PBRF rank C	-0.2652	-0.2391	0.187	0.1439	-0.0007	0.0201
Proportion of academics attaining PBRF rank C(NE)	0.0557	-0.0526	-0.1417	0.028	-0.2719	0.247
Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave	-0.2377	-0.2882	-0.0477	0.1699	0.4761	-0.0026
Proportion of academics attaining PBRF rank R	-0.2778	-0.2475	0.0311	0.1911	0.3486	-0.035

Appendix Table 2.B.2 shows descriptively student university achievement – as measured by student *pass rates* – and various controls such as student's gender, ethnicity, age, and the decile of the last secondary school attended. The mean pass rate is 90.31 with a standard deviation of 16.82. Table 2.B.3 which shows the distribution in the pass rate variable for both student cohorts, reveals a decent variability in this variable in both cohorts. The percentage of students achieving a pass rate of 100 is around 50% for both cohorts. Approximately 10% of students have a pass rate between 60-80, 5% between 80-85, and approximately 6% (early cohort) and 8% (later cohort) achieve pass rate between 85-90. In general, there has been a slight improvement in the pass rates of students over the two cohorts. The percentage of female students is higher than males in both cohorts. Specifically, there are over 51% females in the first cohort and 58% females in the second cohort. While the percentage of Māori students has surprisingly fallen from approximately 6% to 3% over time, the percentage of Asian students has increased slightly from approximately 15% to 18%. As expected, students from higher decile high schools are disproportionately represented in the population of university students.

The number of students is fairly large for the second cohort as compared to the first cohort as summarised in Table 2.2. While in second cohort, the number of students exceed 30,600, this number is just above 7,400 for the first cohort. A possible reason for this difference is summarised in Table 2.2. There is a large difference in the number of courses when I restrict the first year of tertiary education studies to 1998/99 as compared to 2007/2008. On further exploring this issue, I find a gradual increase in the number of students until the year 2002 followed by a sharp increase in the year 2003. This may be due to more comprehensive reporting as before the year 2003, there were no National Student Numbers (NSNs), so education data was matched based on the probabilistic methods. Also, a major difference is seen in the step when I restrict the sample to students for whom the main field code is given[6]. As shown in Table 2.2, I lose approximately 60% of students in the first cohort as compared to only 0.02% of students in the second cohort. I witnessed an increase in the proportion of students particularly in Accounting and Finance, Communication, Journalism and Media Studies, Design, Earth Sciences and Economics.

[6] The derived main field of study changes over time as students study towards their final year. This is because a student in their first year may cover a broad range of subjects, but over time, the predominant field based on the subject(s) they study the most will become apparent. If for any reason the Ministry of Education cannot derive this field for a student in a qualification, they default it to the provider-based qualification field of study.

Table 2.2: Difference in the number of students in the two cohorts

	First Year-1998/99		First Year-2007/08	
Observations at the beginning of the course dataset	59,281,524		59,281,524	
Restrictions	**Number of observations remaining**	**Percentage of previous observations remaining**	**Number of observations remaining**	**Percentage of previous observations remaining**
After restriction on first year	2,716,554		5,124,273	
Course providers-universities	885,261	32.59	1,631,469	31.84
Qualification type – Formal/STAR	885,261	100.00	1,518,528	93.08
Checking for discrepancies in "sex" variable	885,120	99.98	1,518,528	100.00
Level of study-Bachelors or STAR	628,167	70.97	1,113,489	73.33
Attended secondary school in NZ	628,152	100.00	1,113,489	100.00
Restriction to courses for which withdrawal date is not given	613,593	97.68	1,091,694	98.04
Course complete code - successfully/unsuccessfully	392,667	63.99	1,044,345	95.66
Checked for discrepancies in "birth year" variable	392,223	99.89	1,044,345	100.00
Restricting observations to students for whom total efts of courses taken is at least 80% full time	295,746	75.40	860,982	82.44
	Observations left			
Converted to student data	24123 (0.08%)		39,315 (0.05%)	
attendance type-intramural and residing in NZ	23,250	96.38	38,214	97.20
students who have taken less than/=50 courses	23,202	99.79	37,803	98.92
total efts consumed in successfully completed courses <=7	23,175	99.88	37,587	99.43
15+ year olds	23,169	99.97	37,581	99.98
Total number of students left after merging with enrolment dataset				
After restricting to matched observations	18,531	79.98	30,669	81.60
students for whom first main field code is given	7,407	39.97	30,663	99.98
number of students left after all restrictions	7,407		30,663	

2.3 Empirical Model

The explanatory variable of primary interest is a summary measure of the research outcomes of each academic department at each New Zealand university as assessed in the PBRF. The dependent variable is the *pass rate* of each undergraduate student at New Zealand universities. I estimate the following empirical model:

$$Y_{ijt} = f(PBRF\ outcomes_{jt},\ ranks_{jt},\ gender\ composition_{jt},\ age\ composition_{jt}, ethnicity_{jt}$$
$$gender_i,\ age_i,\ ethnicity_i,\ high\ school\ decile_i,\ NCEA_i,$$
$$university\ fixed\ effects, subject\ fixed\ effects, year\ fixed\ effects)$$

The variable Y_{ijt} is a measure of the university achievement of a student *i,* in department/subject *j* and cohort *t.* There are two cohorts – undergraduate studies preceding PBRF waves 2003 and 2012. The university achievement of a student is measured by *pass rate*. Pass rate is equal to the total EFTS of successfully completed courses/total EFTS of the courses taken by student *i*. This variable is continuous and ranges from 0 to 100. The primary explanatory variable of interest is *PBRF outcomes* of the majoring department of a student, with other explanatory variables forming controls. *PBRF outcomes* are the percentages of staff rated as A, B, C, C(NE), R and R(NE) in each subject area at each NZ university. The *ranks* of academics are grouped as Professor, Associate Professor, Senior Lecturer, Lecturer, 'other teaching staff' and 'other non-teaching staff' (see Appendix Table 2.A.1). I use the *decile* of the last school attended to capture socio-economic characteristics of students. A school decile is a summary measure determined by household income, occupation, household crowding, and educational qualifications in the school's catchment area. It may serve as a proxy for the students' household environment in terms of the value placed on education and expectations about achievement. I use the high school decile and National Certificate for Educational Achievement (*NCEA*)[7] results as control variables to proxy for students' pre-university circumstances. Since *NCEA* takes place just before entering university, it could also be interpreted as measuring the 'value added' by university education. As shown in Appendix

[7] National Certificate for Educational Achievement is the national qualification system for New Zealand's senior secondary school students. It is made up of three certificates at Levels 1, 2 and 3 and usually studied at secondary school in Years 11, 12 and 13.

Table 2.A.2, I have aggregated NCEA variable into three categories – 'less than NCEA level 3', 'NCEA level 3 achieved' and 'overseas qualification equivalent to NCEA level 3 achieved'.

2.4 Methods and Results

Table 2.3 summarises the effect of research outcomes of academics on student *pass rates* using the Tobit estimator. I use the Tobit estimator because my dependent variable, *pass rate*, is a censored continuous variable with values lying between 0 and 100. My model controls for various department-level and student-level characteristics – researchers' and students' gender, age, and ethnicity. I also include researchers' position title, students' high school decile and the level of NCEA achieved by the students as controls. I have estimated all the coefficients by using university, subject area, and year fixed effects. The proportion of researchers in a department who received a PBRF grade A, B, C(NE), R and the researchers who did not submit their Evidence Portfolios (in 2003 PBRF wave) together form my major independent variable – PBRF outcomes in a department (proportion of researchers in a department who received a PBRF grade C being my omitted category).

I find no systematic differences between more research-active and less research-active departments in terms of pass rates (Table 2.3). For example, I find a negative and statistically insignificant relationship between the percentage of A-grade researchers and student pass rates. The effect is quantitatively negligible with percentage of academics scoring grade C forming the base category[8]. The coefficient of 0.003 suggests that increasing the percentage of A-grade academics in a department by 10 percentage points decreases the pass rate by 0.03 percentage points. The coefficient estimates for the proportions of B and R grade researchers are also very close to zero. I therefore conclude that there are no significant

8 The omitted category variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. Please note that I use these reference categories for succeeding alternative model specifications and estimators and subsample analyses.

effects of the departmental PBRF grade composition on their teaching of undergraduate students.[9] With the proportion of Senior Lecturers forming the base category for the researchers' position title control variable, I find a positive but very small and statistically insignificant relationship between the proportion of Professors and the university achievement of students. Overall, for over 37,000 student-level observations, I do not find any department-level characteristics to be significant determinants of student pass rates. The presence of various offsetting influences, as discussed in the introduction, is a possible explanation for these results. For example, it might be the case that a top-notch researcher might be a more interesting and inspiring teacher, but it might then be that they do not get enough time to devote to their teaching activities. Another plausible reason might be that more research-active academics' time is disproportionately allocated towards postgraduate teaching as compared to undergraduate teaching.

With regards to student characteristics, I generally find significant relationships of the expected signs (Table 2.3). With NZ European/Pākehā students forming the base category, I find significantly lower pass rates for Pasifika and Māori students, with differentials of 23.1 and 12.9 percentage points, respectively. This result is consistent with the findings of other studies, for example, Houghton, (2015) and Else (1997). The average pass rate of female students is 6.9 percentage points higher than for male students. I find consistently lower pass rates for students with previous high school deciles 1 to 4 and higher pass rates for students from high school deciles 6 to 10, as compared to the reference category, school decile 5. Keeping NCEA level 3 achieved as the base category, I find a negative, significant differential in pass rates of approximately 6 percentage points for students achieving only NCEA level 2 and lower. There is a positive but insignificant coefficient for the overseas equivalent of NCEA level 3.

[9] Although I do not find any significant effect on *pass rates* with over 37,000 observations, there are only 42 (subject areas) * 8 (universities) * 2 (PBRF Waves) = 672 unique observations. I have clustered the standard errors at the 'id' level (which is composed of evaluation year, university, and subject area) to deal with this problem.

I could not find an exception to the main findings when I estimated my empirical model separately for each university in New Zealand. That is, I found no evidence that the link between research and teaching is significant in any of the universities individually. This is in spite of the fact that large differences exist in pass rates across universities[10]. In respect to subject areas, with 'Accounting and Finance' forming the base category, I find the lowest pass rates in 'Statistics' (pass rate 14.9 percentage points lower), followed by 'Pure and Applied Mathematics' and 'Philosophy'. I observe the highest pass rates in 'Clinical Medicine' (36.9 percentage points higher than in Accounting and Finance), 'Dentistry' and 'Design'.

[10] I am not allowed to identify specific universities in my thesis due to 5.14.2 entity clause of Stats NZ.

Table 2.3 Determinants of Student Pass Rates; Baseline Model (Tobit)

	Coefficient	Robust S.E.
PBRF Outcomes		
Proportion of academics attaining PBRF rank A	-0.003	0.070
Proportion of academics attaining PBRF rank B	-0.018	0.044
Proportion of academics attaining PBRF rank C(NE)	-0.033	0.058
Proportion of academics attaining PBRF rank R	0.032	0.062
Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave	0.005	0.057
Department Level Characteristics		
Researcher's Position Title		
Proportion of Professors	0.074	0.063
Proportion of Associate Professors	-0.022	0.061
Proportion of Lecturers	-0.018	0.043
Proportion of Other Teaching Staff	0.036	0.093
Proportion of Other Non-Teaching Staff	0.041	0.049
Researcher's Gender		
Proportion of female academics	0.011	0.031
Proportion of academics for whom gender is unknown	-0.003	0.064
Researcher's Age Band		
Proportion of academics in the age band of 20 to 29	0.008	0.135
Proportion of academics in the age band of 40 to 49	-0.056	0.038
Proportion of academics in the age band of 50 to 59	-0.113*	0.049
Proportion of academics in the age band of 60 to 69	0.005	0.050
Proportion of academics in the age band of 70 and Over	-0.217	0.156
Proportion of academics for whom age band is unknown	-0.017	0.060
Researcher's Ethnicity		
Proportion of Asian academics	-0.097	0.053
Proportion of Māori academics	-0.044	0.054
Proportion of Pasifika academics	0.038	0.117
Proportion of Middle Eastern/Latin American/African academics	-0.087	0.195
Proportion of academics belonging to "other ethnicity"	-0.012	0.038
Proportion of academics for whom ethnicity is unknown	-0.007	0.037
Student Level Characteristics		
Student's gender		
Female student	6.876***	0.492
Student's ethnicity		
Asian student	-9.392***	0.791
Māori student	-12.870***	0.862
Pasifika student	-23.088***	1.166
Middle Eastern/Latin American/African student	-12.534***	1.326
Student belonging to "other ethnicity"	-7.115***	0.993
Student for whom ethnicity is unknown	-4.725*	2.389
Student's high school decile		
School decile 1	-5.735***	1.262
School decile 2	-3.527**	1.119
School decile 3	-0.659	0.790
School decile 4	-0.806	0.769
School decile 6	0.470	0.714
School decile 7	0.763	0.708
School decile 8	1.801**	0.683
School decile 9	1.447*	0.687
School decile 10	2.626***	0.664
School decile missing	1.688	2.070

Level of NCEA achieved by the student		
Achieved less than NCEA level 3	-6.188***	0.712
Overseas equivalent to NCEA level 3	2.724**	0.887
Missing observations on NCEA level achieved	-8.429***	1.704
University fixed effects		
University 2	-11.790***	2.659
University 3	-10.100***	2.544
University 4	-5.871*	2.391
University 5	-17.456***	2.472
University 6	-17.501***	2.422
University 7	-4.685*	2.254
University 8	-16.058***	2.748
Subject area fixed effects		
Agriculture and Other Applied Biological Sciences	1.507	2.676
Anthropology and Archaeology	-10.259***	2.904
Architecture, Design, Planning, Surveying	13.689***	2.331
Biomedical	2.962	4.562
Chemistry	-10.759***	2.989
Clinical Medicine	36.908***	4.191
Communications, Journalism and Media Studies	1.209	3.309
Computer Science, Information Technology, Information Sciences	-7.816***	1.815
Dentistry	22.293***	2.223
Design	19.671***	4.241
Earth Sciences	-1.768	3.143
Ecology, Evolution and Behaviour	-2.924	3.337
Economics	-2.062	1.650
Education	6.624**	2.376
Engineering and Technology	3.635	3.004
English Language and Literature	-3.995	2.170
Foreign Languages and Linguistics	-0.717	2.695
History, History of Art, Classics and Curatorial Studies	-5.980**	2.039
Human Geography	-1.112	2.798
Law	8.567***	2.442
Management, Human Resources, Industrial Relations, International Business and Other Business	-4.552*	2.231
Marketing and Tourism	-0.388	1.571
Molecular, Cellular and Whole Organism Biology	-4.195	3.104
Music, Literary Arts and Other Arts	3.098	3.935
Māori Knowledge and Development	-2.485	5.046
Other Health Studies (including Rehabilitation Therapies)	11.661***	3.085
Philosophy	-11.951***	2.502
Physics	-3.445	2.844
Political Science, International Relations and Public Policy	-3.271	2.564
Psychology	-2.906	2.698
Public Health	-3.315	4.536
Pure and Applied Mathematics	-12.688***	2.619
Religious Studies and Theology	-8.972**	2.997
Sociology, Social Policy, Social Work, Criminology and Gender Studies	-7.054**	2.475
Sport and Exercise Science	0.119	2.388
Statistics	-14.904***	2.383
Theatre and Dance, Film and Television and Multimedia	1.838	3.762
Veterinary Studies and Large Animal Science	10.073*	4.635
Visual Arts and Crafts	15.335***	3.598
Year fixed effects		

First year at the tertiary education institute of the student – 1999	1.835	0.994
First year at the tertiary education institute of the student – 2007	3.233	2.294
First year at the tertiary education institute of the student – 2008	3.098	2.287
constant	112.755***	4.984
Number of observations	37,383	

Notes: (1) The dependent variable is the *pass rate* of the student. (2) The robust standard errors which are clustered on the *id* (*id* is composed of evaluation year, university, and subject area) level. Standard errors are adjusted for 531 clusters in *id*. (3) The omitted category variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (4) The omitted category variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. I have estimated all the coefficients by using university, subject area, and year fixed effects. (5) I am not allowed to identify specific universities due to the 5.14.2 confidentiality entity clause set by Stats NZ. (6) Significance levels are indicated by: * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$.

2.5 Alternative Model Specifications and Estimators and Subsample Analysis

2.5.1 Alternative Model Specifications and Estimators

Table 2.4 shows alternative model specifications and estimators. As with my primary model, I include two sets of control variables for each set of regressions – department-level and student-level controls (except for the model in column 6). I only report the PBRF outcomes in the table for the purposes of brevity[11]. Department-level controls include researchers' position title, gender, age, and ethnicity. All models also control for student's gender, age, ethnicity, high school decile and level of NCEA achieved. The second column in Table 2.4 shows the results of my main analysis – the Tobit model, for a point of comparison.

The third and the fourth columns depict the results for each of the two PBRF waves (2003 and 2012) in isolation. I run these models separately because a couple of changes were witnessed between these two PBRF waves. The first was that Colleges of Education were subsumed into universities both before and after the 2003 PBRF waves. The second was that the Tertiary Education Commission changed the rules related to submission of evidence portfolios over this time period. In the 2003 PBRF wave, academics who did not submit their

[11] Please refer to the Appendix 2C, 2D, 2E and 2F for the full tables.

Evidence Portfolio were assigned the Quality Category 'R'. However, in the 2012 wave, a Quality Category was assigned only to academics who submitted their Evidence Portfolios (Buckle & Creedy, 2018). I find insignificant effects of research achievement on student outcomes for both PBRF waves. These results are consistent with the results of my main model.

The subsequent columns show the results of re-estimation of my model using OLS (fifth column) and without departmental controls (sixth column). OLS estimation reinforces my findings from the main analysis – very small, statistically insignificant coefficients on the PBRF outcomes of academics. I have also tested the hypothesis that PBRF quality categories are jointly affecting pass rates. I test this hypothesis using an F-test and again, I obtain highly statistically insignificant results (Prob>F = 0.97). Likewise, when I exclude some of the right-hand side variables of my model, I get the same result. The reason for excluding all department-level controls is to check for multicollinearity between the PBRF outcomes and various controls related to academics. For instance, the proportion of researchers achieving PBRF grade A is correlated with the proportion of Professors in the department. Nonetheless, I still find an insignificant relationship between the PBRF outcomes and students' achievement as measured by *pass rates*.

The last robustness check I use is a probit estimation (Table 2.5) mimicking the work of Engler (2010) for the New Zealand Ministry of Education. My results remain qualitatively similar to the main results. I find no significant impact of the research activity of the departments on students' likelihood of passing 75%, 80%, 90% or 95% of their courses. As expected from earlier, none of the department-level controls matter for pass rates, while student characteristics are highly predictive of pass rates.

Table 2.4 Determinants of Student Pass Rates; Alternative Model Specifications and Estimators

	Tobit Model	Tobit Model for PBRF wave 2003	Tobit Model for PBRF wave 2012	OLS	No department level controls
PBRF Outcomes					
Proportion of academics attaining PBRF rank A	-0.003	-0.101	0.028	0.017	0.051
	(0.070)	(0.154)	(0.076)	(0.034)	(0.05)
Proportion of academics attaining PBRF rank B	-0.018	-0.060	-0.019	-0.008	-0.011
	(0.044)	(0.079)	(0.045)	(0.021)	(0.038)
Proportion of academics attaining PBRF rank C(NE)	-0.033	n.a.	-0.087	0.000	0.009
	(0.058)	n.a.	(0.060)	(0.032)	(0.051)
Proportion of academics attaining PBRF rank R	0.032	0.044	-0.101	0.008	0.026
	(0.062)	(0.093)	(0.098)	(0.031)	(0.061)
Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave	0.005	-0.145	n.a.	0.003	0.015
	(0.057)	(0.085)	n.a.	(0.027)	(0.055)
Number of observations	37,383	7,131	30,252	37,383	37,383

Notes: (1) The dependent variable is the pass rate of the student. (2) The top values are the coefficient estimates. The bottom values in parentheses are the associated robust standard errors which are clustered on the id (id is composed of evaluation year, university, and subject area) level. (3) Only coefficients on PBRF grades are reported for brevity. However, all the models (except in column 6) control for researchers' position title, gender, age, and ethnicity. All the models also control for students' gender, age, ethnicity, high school decile and level of NCEA achieved. Please refer to the Appendix for the full tables. (4) The omitted category variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (5) The omitted category variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. (6) I have estimated all the above coefficients by using university, subject area, and year fixed effects. (6) I am not allowed to identify specific universities due to the 5.14.2 confidentiality entity clause set by Stats NZ. (7) Significance levels are indicated by: * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$. (8) Please refer to the Appendix for the department level and student level controls.

Table 2.5 Determinants of Student Pass Rates; Alternative Model Specifications and Estimators: Probit Model

	Likelihood of passing 75% of the courses	Likelihood of passing 80% of the courses	Likelihood of passing 90% of the courses	Likelihood of passing 95% of the courses
PBRF Outcomes				
Proportion of academics attaining PBRF rank A	0.0004	0.0001	-0.0006	-0.0014
	(0.0004)	(0.0005)	(0.0009)	(0.0011)
Proportion of academics attaining PBRF rank B	-0.0001	-0.0003	-0.0004	-0.0007
	(0.0003)	(0.0004)	(0.0006)	(0.0007)
Proportion of academics attaining PBRF rank C(NE)	0.0003	-0.0005	-0.0003	-0.0002
	(0.0004)	(0.0006)	(0.0009)	(0.0009)
Proportion of academics attaining PBRF rank R	-0.0000	-0.0005	-0.0002	0.0004
	(0.0004)	(0.0005)	(0.0009)	(0.0011)
Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave	-0.0003	-0.0005	-0.0005	-0.0004
	(0.0003)	(0.0005)	(0.0008)	(0.0010)
Number of observations	37,383	37,383	37,383	37,383

Notes: (1) The dependent variable is the pass rate of the student. (2) The top values are the coefficient estimates. The bottom values in parentheses are the associated robust standard errors which are clustered on the id (id is composed of evaluation year, university, and subject area) level. (3) Only coefficients on PBRF grades are reported for brevity. However, all the models (except in column 6) control for researchers' position title, gender, age, and ethnicity. All the models also control for students' gender, age, ethnicity, high school decile and level of NCEA achieved. Please refer to the Appendix for the full tables. (4) The omitted category variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (5) The omitted category variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. (6) I have estimated all the above coefficients by using university, subject area, and year fixed effects. (6) I am not allowed to identify specific universities due to the 5.14.2 confidentiality entity clause set by Stats NZ. (7) Significance levels are indicated by: * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$. (8) Please refer to the Appendix for the department level and student level controls.

2.5.2 Subsample Analysis

In this section, I re-estimate my empirical model for different subsets of the full dataset. This allows me to potentially tease out any significant effects that might be hidden when using the full sample. However, I find insignificant, homogeneous effects for all the subsamples which supports the findings of my main model.

My analysis for male and female students is shown in columns 2 and 3 of Table 2.6. While research-active departments affect the *pass rates* of female students positively, they have a negative impact on the *pass rates* of male students. However, the impact is statistically insignificant in both cases and hence cannot be distinguished from zero. The results of the next subgroup according to students' high school deciles 1-3, 4-6 and 7-10 are presented in columns 4, 5 and 6 respectively. As summarised in Table 2.6, no decile group witnesses a significant impact of research performance. For robustness purposes, I also estimated the model individually for each decile and found broadly consistent results.

Next, I stratify the sample by the nature of academic subjects – Humanities, Natural Sciences, Professions and Social Sciences[12] as shown in columns 7, 8, 9 and 10, respectively, in Table 2.. This is done to explore whether my findings differ for various subject areas. As presented in Table 2., an increase in the proportion of academics achieving grade 'C(NE)' decreases the average *pass rates* by 3.6 percentage points and 2.5 percentage points for students of Humanities and Social Sciences, respectively. However, this effect is small.

I also restrict my sample to students who attempted at least 3 EFTS (or at least 360 credits) to avoid any confounding due to student dropouts. This leaves me with 25,962 students. This restriction helps me to limit my sample to "persistent" students by still including some of the weakest students in my sample but excluding those who have "given up". Again, my findings are consistent with the results of the main model – I find no significant link between

[12] Please refer to the Appendix Table 2.A.3 for classification of 42 subject areas into broad groups.

departmental PBRF outcomes and *pass rates* of students who attempted at least 360 credits (column 11 of Table 2.).

As mentioned previously, the Colleges of Education were amalgamated within universities before and after the 2003 PBRF wave. Therefore, to check the consistency and robustness of my findings, I analyse my model by excluding those students for whom the main field of study is 'Education'. My estimates are displayed in column 12 of Table 2. and are statistically and economically insignificant.

I also perform a subsample analysis on the basis of NCEA achievement and high school decile in order to check whether potentially more motivated students – as proxied by NCEA and high school decile - appreciate/respond to research-informed teaching differently than potentially less motivated students. Similar insignificant results are shown in columns 14 and 15. However, column 16 of Table 2., which presents the results for overseas equivalent of NCEA level 3, shows a puzzling positive, significant impact of the proportion of 'R' grade researchers and researchers who did not submit their Evidence Portfolio on student *pass rates*. However, the impact is small and given the large number of coefficients being estimated here, I am reluctant to draw strong conclusions from an isolated statistically significant result. Results according to students' ethnicity sub-groups are presented in columns 18, 19 and 20 of Table 2.. Overall, I find no systematic differences in my results for NZ European, Asian and NZ Māori students.

Table 2.6 Determinants of Student Pass Rates; Subsample Analysis (continued on next page)

	Gender		Decile			Subject Groups			
	Male Student (2)	Female Student (3)	Dec 1 to 3 (4)	Dec 4 to 6 (5)	Dec 7 to 10 (6)	Humanities (7)	Natural Sciences (8)	Professions (9)	Social Sciences (10)
PBRF Outcomes									
Proportion of academics attaining PBRF rank A	-0.022	0.010	0.091	-0.051	0.000	-0.093	-0.190	-0.123	0.088
	(0.075)	(0.078)	(0.118)	(0.084)	(0.072)	(0.106)	(0.149)	(0.125)	(0.124)
Proportion of academics attaining PBRF rank B	-0.027	-0.009	0.026	-0.047	-0.016	0.036	-0.014	-0.050	-0.064
	(0.045)	(0.049)	(0.072)	(0.052)	(0.045)	(0.066)	(0.105)	(0.085)	(0.073)
Proportion of academics attaining PBRF rank C(NE)	-0.045	-0.019	0.040	0.002	-0.044	-0.361***	-0.074	0.075	-0.258*
	(0.069)	(0.067)	(0.114)	(0.076)	(0.061)	(0.102)	(0.153)	(0.077)	(0.123)
Proportion of academics attaining PBRF rank R	0.057	-0.009	0.034	-0.002	0.069	-0.011	-0.040	0.088	-0.160
	(0.070)	(0.067)	(0.085)	(0.075)	(0.063)	(0.125)	(0.117)	(0.096)	(0.166)
Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave	-0.006	-0.014	-0.047	0.002	0.023	0.076	0.073	-0.106	-0.048
	(0.071)	(0.057)	(0.083)	(0.059)	(0.072)	(0.125)	(0.125)	(0.090)	(0.147)
Number of observations	16,125	21,255	4,197	10,371	22,563	4,560	3,954	15,150	7,398

Notes: (1) The dependent variable is the *pass rate* of the student. (2) The top values are the coefficient estimates. The bottom values in parentheses are the associated robust standard errors which are clustered on the *id* (*id* is composed of evaluation year, university, and subject area) level. (3) Only coefficients on PBRF grades are reported for brevity. However, all the models control for researchers' position title, gender, age, and ethnicity. All the models also control for students' gender, age, ethnicity, high school decile and level of NCEA achieved. (4) The omitted category variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (5) The omitted category variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. I have estimated all the coefficients by using university, subject area, and year fixed effects. (6) I am not allowed to identify specific universities due to the 5.14.2 confidentiality entity clause set by Stats NZ. (7) Significance levels are indicated by: * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$. (8) Please refer to the appendix for the department level and student level controls.

Table 2.6 Determinants of Student Pass Rates; Subsample Analysis (continued)

	Miscellaneous			NCEA Level Achieved				Student Ethnicity		
	Minimum 3 EFTS attempted	Subject Area excluding Education	Without department level controls	Less than NCEA level 3 achieved	NCEA level 3 achieved	Overseas Equivalent NCEA Level 3 Achieved	NCEA Missing	NZ European Student	Asian Student	NZ Māori
	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
PBRF Outcomes										
Proportion of academics attaining PBRF rank A	-0.088	-0.016	0.051	-0.001	0.010	-0.001	-0.398	0.029	0.015	-0.033
	(0.064)	(0.073)	(0.05)	(0.098)	(0.064)	(0.204)	(0.374)	(0.072)	(0.108)	(0.162)
Proportion of academics attaining PBRF rank B	-0.041	-0.032	-0.011	-0.050	0.011	0.131	-0.091	0.008	-0.059	0.045
	(0.039)	(0.045)	(0.038)	(0.054)	(0.038)	(0.134)	(0.257)	(0.047)	(0.067)	(0.093)
Proportion of academics attaining PBRF rank C(NE)	-0.058	-0.048	0.009	-0.051	-0.007	-0.185	0.489	-0.022	-0.075	0.112
	(0.05)	(0.061)	(0.051)	(0.084)	(0.055)	(0.159)	(0.369)	(0.061)	(0.083)	(0.161)
Proportion of academics attaining PBRF rank R	0.078	0.025	0.026	-0.017	0.079	0.570**	-0.093	0.076	0.042	-0.124
	(0.071)	(0.065)	(0.061)	(0.068)	(0.077)	(0.221)	(0.230)	(0.069)	(0.095)	(0.118)
Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave	0.066	-0.005	0.015	-0.047	0.061	0.722*	0.289	-0.010	0.126	0.033
	(0.059)	(0.059)	(0.055)	(0.06)	(0.071)	(0.315)	(0.253)	(0.059)	(0.090)	(0.115)
Number of observations	25,962	34,578	37,383	10,485	24,858	1,566	474	26,880	6,267	1,641

Notes: (1) The dependent variable is the pass rate of the student. (2) The top values are the coefficient estimates. The bottom values in parentheses are the associated robust standard errors which are clustered on the id (id is composed of evaluation year, university, and subject area) level. (3) Only coefficients on PBRF grades are reported for brevity. However, all the models control for researchers' position title, gender, age, and ethnicity. All the models also control for students' gender, age, ethnicity, high school decile and level of NCEA achieved. (4) The omitted category variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (5) The omitted category variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. I have estimated all the coefficients by using university, subject area, and year fixed effects. (6) I am not allowed to identify specific universities due to the 5.14.2 confidentiality entity clause set by Stats NZ. (7) Significance levels are indicated by: * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$. (8) Please refer to the appendix for the department level and student level controls.

2.6 Conclusion

The relationship between research and teaching has intrigued academics and policymakers all over the world. In this chapter, I investigate the relationship between a measure of the research activity of departments and university achievement of undergraduate students. My research is novel since I use a rich, national, individual-level dataset for all undergraduate students studying at the eight universities in New Zealand as opposed to pre-existing studies which typically analyse one or a few departments in a university or compare a specific subject area across two or more universities. PBRF grades provide a standardized measure to assess research outcomes of all academics, allowing me to conduct my analysis at the national level.

My baseline results find no significant relationship between the research performance of departments and undergraduate student pass rates. This might be because of various offsetting influences. For example, research-active academics might be more engaging and knowledgeable lecturers, but their time might be devoted to research, supervision, and teaching postgraduate students rather than teaching undergraduates.

Admittedly, pass rates are also a relatively crude measure of performance and may be subjective. Different departments may have different standards/expectations of student performance. Moreover, the stringency of standards may possibly be related to academics' own research success. I circumvent these issues in Chapter-4 where I investigate the impacts of academics' research performance on their students' later job market outcomes. Employment outcomes are arguably a more objective and 'universal' measure.

Notwithstanding the limitations above, my findings from Chapter-2 – if corroborated by my subsequent analyses - may have significant implications for policy makers. Specifically, my results so far suggest that there is no relationship between teaching informed by research (or other benefits of academics' research for student success) and student pass rates at the

undergraduate level. This begs the question of whether it is effective to fund universities based on academics' research performance. Perhaps there may be scope for teaching-specialised and research-specialised academics (and universities)? I investigate this further by studying the relationship between the research performance of academics and students' evaluation of academics in Chapter-3, and students' longer term, labour market outcomes in Chapter-4.

Appendix 2A: Aggregation and Conversion

Table 2.A.1: Aggregating Position Titles of Academics

Aggregated category	Raw Data
Associate Professor	Associate Professor
Associate Professor	Assoc Professor in Soil Sci
Associate Professor	Associate HOS/Assoc Professor
Associate Professor	Associate Professor (LV)
Associate Professor	Associate Professor (Mgr.)
Associate Professor	Associate Professor (NRC)
Associate Professor	Associate Professor Clinical
Associate Professor	Associate Professor and Dean/ Head of Dept
Associate Professor	Associate Professor/ Head of Department
Associate Professor	Associate Professor/ Head of School
Associate Professor	Associate Professor/Dean
Associate Professor	Associate Professor/Reader
Associate Professor	Asst Prof in Urban Studies
Associate Professor	Clinical Associate Professor
Associate Professor	Reader
Associate Professor	Senior Lecturer/Associate Professor
Lecturer	Clinical Lecturer
Lecturer	Hourly Paid Lecturer
Lecturer	Junior Lecturer
Lecturer	Lecturer
Lecturer	Lecturer E-Commerce/Info Systems
Lecturer	Lecturer & Research Administrator.
Lecturer	Lecturer (Mgmt. resps)
Lecturer	Lecturer Clinical
Lecturer	Lecturer in Accounting
Lecturer	Lecturer in Agro-Ecology
Lecturer	Lecturer in Economics
Lecturer	Lecturer in Farm Management
Lecturer	Lecturer in Outdoor Leadership
Lecturer	Lecturer in Philosophy
Lecturer	Lecturer in Social Science
Lecturer	Lecturer in Viticulture
Lecturer	Lecturer in Wildlife Mgmt.
Lecturer	Principal Lecturer
Lecturer	Supernumerary Lecturer
Lecturer	Visiting Lecturer
Other Non-Teaching Staff	Aca Leader in Human Nutrition
Other Non-Teaching Staff	Academic Director
Other Non-Teaching Staff	Acting Director
Other Non-Teaching Staff	Acting Head of School
Other Non-Teaching Staff	Adjunct Associate Professor
Other Non-Teaching Staff	Adjunct Lecturer
Other Non-Teaching Staff	Adjunct Prof of Industr Mathm
Other Non-Teaching Staff	Adjunct Professor
Other Non-Teaching Staff	Artist
Other Non-Teaching Staff	Assistant
Other Non-Teaching Staff	Associate Director
Other Non-Teaching Staff	Associate Head of School
Other Non-Teaching Staff	Associate Pro Vice Chancellor
Other Non-Teaching Staff	Avc (Māori)
Other Non-Teaching Staff	Aca Leader in Human Nutrition
Other Non-Teaching Staff	Academic Director
Other Non-Teaching Staff	Academic Group Manager
Other Non-Teaching Staff	Acting Director, NEOH
Other Non-Teaching Staff	Acting Head of Institute
Other Non-Teaching Staff	Acting Head of School

Other Non-Teaching Staff	Adjunct Associate Professor
Other Non-Teaching Staff	Adjunct Lecturer
Other Non-Teaching Staff	Adjunct Prof of Indigenous Study
Other Non-Teaching Staff	Adjunct Professor
Other Non-Teaching Staff	Advisor
Other Non-Teaching Staff	Albany Academic Director
Other Non-Teaching Staff	Artist in Residence
Other Non-Teaching Staff	Assistant Director
Other Non-Teaching Staff	Assistant Faculty Registrar
Other Non-Teaching Staff	Assistant Research Fellow
Other Non-Teaching Staff	Assistant Vice Chancellor
Other Non-Teaching Staff	Assoc Dean - Māori Advancement
Other Non-Teaching Staff	Assoc HOS Academic
Other Non-Teaching Staff	Assoc Head of School
Other Non-Teaching Staff	Associate Dean
Other Non-Teaching Staff	Associate Dean - Academic
Other Non-Teaching Staff	Associate Dean - Development
Other Non-Teaching Staff	Associate Dean - Postgraduate
Other Non-Teaching Staff	Associate Dean - Research
Other Non-Teaching Staff	Associate Dean - Undergraduate
Other Non-Teaching Staff	Associate Dean, Academic
Other Non-Teaching Staff	Associate Dean, International
Other Non-Teaching Staff	Associate Dean, Research
Other Non-Teaching Staff	Associate Director
Other Non-Teaching Staff	Associate Director, Injury Prevention Research ...
Other Non-Teaching Staff	Associate HOS (Academic)
Other Non-Teaching Staff	Associate HOS - Academic
Other Non-Teaching Staff	Associate Head of School
Other Non-Teaching Staff	Associate Research Professor
Other Non-Teaching Staff	Asst to VC (Intl Lsn/Spl Prj)
Other Non-Teaching Staff	Biostat & Sen Researcher
Other Non-Teaching Staff	Biostatistician/Data Manager
Other Non-Teaching Staff	Biostatistician
Other Non-Teaching Staff	Biostatistician/Snr Researcher
Other Non-Teaching Staff	Chair
Other Non-Teaching Staff	Consultant
Other Non-Teaching Staff	Coordinator
Other Non-Teaching Staff	Centre Director
Other Non-Teaching Staff	Chair
Other Non-Teaching Staff	Chair in Genetics & Director of Genetics Programme
Other Non-Teaching Staff	Clinical Consultant
Other Non-Teaching Staff	Clinical Coordinator
Other Non-Teaching Staff	Clinical Director
Other Non-Teaching Staff	Clinical Director Academic
Other Non-Teaching Staff	Clinical Manager Surgery Vascular Diagnostic Unit
Other Non-Teaching Staff	Co-Ordinator
Other Non-Teaching Staff	Co-ordinator Academic
Other Non-Teaching Staff	Commercial Law Major Leader
Other Non-Teaching Staff	Companion Animal Community Vet
Other Non-Teaching Staff	Composer in Residence
Other Non-Teaching Staff	Contractor
Other Non-Teaching Staff	Coordinator
Other Non-Teaching Staff	Coordinator & Workforce Development
Other Non-Teaching Staff	Deputy Vc (Wellington)
Other Non-Teaching Staff	Deputy Vice-Chancellor (Māori)
Other Non-Teaching Staff	Deputy Vice-Chancellor (Research)
Other Non-Teaching Staff	Director
Other Non-Teaching Staff	Director - Centre for Smer
Other Non-Teaching Staff	Director - Disp Res Centre
Other Non-Teaching Staff	Director - Teacher Education
Other Non-Teaching Staff	Director - Vet Teaching Hosp
Other Non-Teaching Staff	DVC, Research and Development
Other Non-Teaching Staff	Dean

Other Non-Teaching Staff	Dean Health and Environmental Sci
Other Non-Teaching Staff	Dean of Business and Law
Other Non-Teaching Staff	Dean of Culture and Society
Other Non-Teaching Staff	Dean of Faculty
Other Non-Teaching Staff	Dean of Law
Other Non-Teaching Staff	Dean of Postgraduate Studies
Other Non-Teaching Staff	Deputy Director of EOS
Other Non-Teaching Staff	Deputy Dean
Other Non-Teaching Staff	Deputy Dean (Research) / HOS
Other Non-Teaching Staff	Deputy Dean of Faculty
Other Non-Teaching Staff	Deputy Head of School
Other Non-Teaching Staff	Deputy Vice Chancellor
Other Non-Teaching Staff	Director
Other Non-Teaching Staff	Director Development Studies
Other Non-Teaching Staff	Director - Aca Prog. Quality
Other Non-Teaching Staff	Director - Academic
Other Non-Teaching Staff	Director - Animal Nutrition & Phys
Other Non-Teaching Staff	Director - Centre for 18th - Cent Music
Other Non-Teaching Staff	Director - Centre for Erg + OSH
Other Non-Teaching Staff	Director - Defence Studies
Other Non-Teaching Staff	Director - Disp Res Centre
Other Non-Teaching Staff	Director - Grad School of Edu
Other Non-Teaching Staff	Director - IMAC
Other Non-Teaching Staff	Director - Massey Ag
Other Non-Teaching Staff	Director - Training & Development Unit
Other Non-Teaching Staff	Director - Vet Teaching Hosp
Other Non-Teaching Staff	Director Academic
Other Non-Teaching Staff	Director IPP
Other Non-Teaching Staff	Director Inst Biomedical Tech
Other Non-Teaching Staff	Director Interdisciplinary Unit
Other Non-Teaching Staff	Director KEDRI
Other Non-Teaching Staff	Director NZ Dictionary Centre
Other Non-Teaching Staff	Director NZHTA Clearing House
Other Non-Teaching Staff	Director NZWALMI
Other Non-Teaching Staff	Director TWRU
Other Non-Teaching Staff	Director in Scriptwriting
Other Non-Teaching Staff	Director of BSC Tech
Other Non-Teaching Staff	Director of Centre for Gene Research
Other Non-Teaching Staff	Director of Clinical Education
Other Non-Teaching Staff	Director of E-Learning
Other Non-Teaching Staff	Director of Graduate Programmes
Other Non-Teaching Staff	Director of the Radiation Therapy Course and HOD
Other Non-Teaching Staff	Director, Academic
Other Non-Teaching Staff	Director, Clinical Trials Research Unit
Other Non-Teaching Staff	Director, Flexible Learning
Other Non-Teaching Staff	Director, MBA (Auckland)
Other Non-Teaching Staff	Director, Post Grad Studies
Other Non-Teaching Staff	Director/Head of Centre
Other Non-Teaching Staff	Divisional Director
Other Non-Teaching Staff	Donald Collie Chair of English
Other Non-Teaching Staff	EQC Fellow
Other Non-Teaching Staff	EVALUATION RESEARCHER
Other Non-Teaching Staff	Emeritus Professor
Other Non-Teaching Staff	Engineer
Other Non-Teaching Staff	Environmental Scientist
Other Non-Teaching Staff	Evaluation Researcher
Other Non-Teaching Staff	Executive Academic
Other Non-Teaching Staff	Executive Director
Other Non-Teaching Staff	Executive Manager, AUTEC
Other Non-Teaching Staff	FORST Postdoctoral Fellow
Other Non-Teaching Staff	Faculty Manager
Other Non-Teaching Staff	Faculty Registrar
Other Non-Teaching Staff	Food Engineer

Other Non-Teaching Staff	Food Technologist
Other Non-Teaching Staff	Frances Hodgkins Fellowship
Other Non-Teaching Staff	Graduate Assistant
Other Non-Teaching Staff	Gallery Curator
Other Non-Teaching Staff	Geospatial Research Fellow
Other Non-Teaching Staff	Groundwater Modelling Engineer
Other Non-Teaching Staff	Groundwater Researcher
Other Non-Teaching Staff	Group Manager
Other Non-Teaching Staff	Head of Institute
Other Non-Teaching Staff	Head of School
Other Non-Teaching Staff	HRC Postdoctoral Fellow
Other Non-Teaching Staff	HRC Research Fellow
Other Non-Teaching Staff	HRC Senior Research Fellow
Other Non-Teaching Staff	Hardware Development Leader
Other Non-Teaching Staff	Head of Division
Other Non-Teaching Staff	Head of Institute
Other Non-Teaching Staff	Head of Podiatry
Other Non-Teaching Staff	Head of Research
Other Non-Teaching Staff	Head of Research-Math Sciences
Other Non-Teaching Staff	Head of School
Other Non-Teaching Staff	Head of School, Journalism
Other Non-Teaching Staff	Head, Off of Undergrad Studies
Other Non-Teaching Staff	Deputy Director (Academic)
Other Non-Teaching Staff	Hydrogeologist
Other Non-Teaching Staff	Hydrologist/Modeller
Other Non-Teaching Staff	IT/GIS Consultant
Other Non-Teaching Staff	Junior Research Officer
Other Non-Teaching Staff	Jnr Res Fell (Grade II)
Other Non-Teaching Staff	John David Stout Research Fellow
Other Non-Teaching Staff	Junior Research Assistant
Other Non-Teaching Staff	Junior Research Officer
Other Non-Teaching Staff	Kai-arahi Māori Advisor
Other Non-Teaching Staff	Laboratory Manager
Other Non-Teaching Staff	Laboratory Officer
Other Non-Teaching Staff	Laboratory Technician
Other Non-Teaching Staff	Leader IFNHH (Albany)
Other Non-Teaching Staff	Learning & Teaching Advisor
Other Non-Teaching Staff	Manager - Fresh Tech
Other Non-Teaching Staff	Marsden Postdoctoral Fellow
Other Non-Teaching Staff	Massey Postdoctoral Fellow
Other Non-Teaching Staff	Manager
Other Non-Teaching Staff	Manager - Fresh Tech
Other Non-Teaching Staff	Manager Academic
Other Non-Teaching Staff	Manager Technical
Other Non-Teaching Staff	Manager-Research
Other Non-Teaching Staff	Marsden Fellow
Other Non-Teaching Staff	Marsden Postdoctoral Fellow
Other Non-Teaching Staff	Masonic Fellow
Other Non-Teaching Staff	Massey Postdoctoral Fellow
Other Non-Teaching Staff	Matauranga Māori
Other Non-Teaching Staff	Medical Assessor
Other Non-Teaching Staff	Mental Health Research Nurse
Other Non-Teaching Staff	Mgr. Biological Husbandry Unit
Other Non-Teaching Staff	Mozart Fellowship
Other Non-Teaching Staff	Musicianship Specialist
Other Non-Teaching Staff	National Manager KPTO
Other Non-Teaching Staff	On-line Coordinator
Other Non-Teaching Staff	Postdoctoral Fellow
Other Non-Teaching Staff	Postharvest Technologist
Other Non-Teaching Staff	Pro Vice-Chancellor
Other Non-Teaching Staff	Professional Clinician
Other Non-Teaching Staff	Programme Manager
Other Non-Teaching Staff	PVC Commercialisation

Other Non-Teaching Staff	PVC Research
Other Non-Teaching Staff	PVC Vice Chancellor's Office
Other Non-Teaching Staff	Pacific National Coordinator
Other Non-Teaching Staff	Paediatric Neuropsychologist
Other Non-Teaching Staff	Post-Doctoral Fellow
Other Non-Teaching Staff	Post-Doctoral Research Fellow
Other Non-Teaching Staff	Post-Doctoral Researcher
Other Non-Teaching Staff	Post Doctorate Fellow
Other Non-Teaching Staff	Post-Doctoral Fellow
Other Non-Teaching Staff	Post Grad Research Education Leader
Other Non-Teaching Staff	Postdoc Fellow
Other Non-Teaching Staff	Postdoc Fellow (Beauveria)
Other Non-Teaching Staff	Postdoc Fellow (Scleractinia)
Other Non-Teaching Staff	Postdoctoral Fellow
Other Non-Teaching Staff	Postdoctoral Fellow (Fungal mo)
Other Non-Teaching Staff	Postdoctoral Fellowship
Other Non-Teaching Staff	Postdoctoral Research Fellow
Other Non-Teaching Staff	Postgraduate Programme Coordinator
Other Non-Teaching Staff	Principal Research Officer
Other Non-Teaching Staff	Principal Scientist
Other Non-Teaching Staff	Pro Vice Chancellor
Other Non-Teaching Staff	Pro Vice Chancellor Law
Other Non-Teaching Staff	Pro Vice-Chancellor
Other Non-Teaching Staff	Pro-Vice-Chancellor
Other Non-Teaching Staff	Professorial Fellow
Other Non-Teaching Staff	Professorial Research Fellow
Other Non-Teaching Staff	Programme Coordinator
Other Non-Teaching Staff	Programme Director
Other Non-Teaching Staff	Programme Leader
Other Non-Teaching Staff	Programme Manager
Other Non-Teaching Staff	Programmer
Other Non-Teaching Staff	Project Coordinator
Other Non-Teaching Staff	Project Manager
Other Non-Teaching Staff	Project Supervisor
Other Non-Teaching Staff	Regional Director Wellington
Other Non-Teaching Staff	Research Assistant
Other Non-Teaching Staff	Research Fellow
Other Non-Teaching Staff	Research Officer
Other Non-Teaching Staff	Research Scientist
Other Non-Teaching Staff	Researcher
Other Non-Teaching Staff	Resident
Other Non-Teaching Staff	Resident Scholar
Other Non-Teaching Staff	Regional Director Wellington
Other Non-Teaching Staff	Research Associate Professor
Other Non-Teaching Staff	Research Assistant
Other Non-Teaching Staff	Research Assistant - 37.5 hpw
Other Non-Teaching Staff	Research Associate
Other Non-Teaching Staff	Research Associate Professor
Other Non-Teaching Staff	Research Chemist
Other Non-Teaching Staff	Research Coordinator
Other Non-Teaching Staff	Research Engineer
Other Non-Teaching Staff	Research Fellow
Other Non-Teaching Staff	Research Fellow (Plant Transgenics)
Other Non-Teaching Staff	Research Fellow Clinical
Other Non-Teaching Staff	Other
Other Non-Teaching Staff	Research Leader (MWRCE)
Other Non-Teaching Staff	Research Lecturer
Other Non-Teaching Staff	Research Lecturer Above the Bar
Other Non-Teaching Staff	Research Lecturer above Bar
Other Non-Teaching Staff	Research Manager
Other Non-Teaching Staff	Research Nurse
Other Non-Teaching Staff	Research Officer
Other Non-Teaching Staff	Research Officer*

Other Non-Teaching Staff	Research Principal
Other Non-Teaching Staff	Research Professor
Other Non-Teaching Staff	Research Scientist
Other Non-Teaching Staff	Research Senior Lecturer
Other Non-Teaching Staff	Research Support
Other Non-Teaching Staff	Research Technician
Other Non-Teaching Staff	Research and Development Engineer
Other Non-Teaching Staff	Research fellow
Other Non-Teaching Staff	Researcher
Other Non-Teaching Staff	Resident in Vet Pathology
Other Non-Teaching Staff	Senior Professional Clinician
Other Non-Teaching Staff	Senior Research Fellow
Other Non-Teaching Staff	Senior Research Officer
Other Non-Teaching Staff	Senior Researcher
Other Non-Teaching Staff	Statistician
Other Non-Teaching Staff	Study Manager
Other Non-Teaching Staff	Scientific Officer
Other Non-Teaching Staff	Scientist
Other Non-Teaching Staff	Senior Advisor
Other Non-Teaching Staff	Senior Associate
Other Non-Teaching Staff	Senior Biostatistician
Other Non-Teaching Staff	Senior Computer Scientist
Other Non-Teaching Staff	Senior Consultant
Other Non-Teaching Staff	Senior Engineer
Other Non-Teaching Staff	Senior Fellow
Other Non-Teaching Staff	Senior Nurse Consultant
Other Non-Teaching Staff	Senior Programmer Analyst
Other Non-Teaching Staff	Senior Project Manager
Other Non-Teaching Staff	Senior Research Associate
Other Non-Teaching Staff	Senior Research Engineer
Other Non-Teaching Staff	Senior Research Fellow
Other Non-Teaching Staff	Senior Research Fellow/Associate Professor
Other Non-Teaching Staff	Senior Research Lecturer
Other Non-Teaching Staff	Senior Research Officer
Other Non-Teaching Staff	Senior Research Scientist
Other Non-Teaching Staff	Senior Researcher
Other Non-Teaching Staff	Senior Technical Officer
Other Non-Teaching Staff	Senior Technician
Other Non-Teaching Staff	Senior Technician, Surgery, Biochemistry Lab
Other Non-Teaching Staff	Snr Res & Dev Engr/Transpower
Other Non-Teaching Staff	Snr Res Fellow/Assoc Prof
Other Non-Teaching Staff	Snr Research Fellow
Other Non-Teaching Staff	Software Technician
Other Non-Teaching Staff	Statistician
Other Non-Teaching Staff	String Quartet
Other Non-Teaching Staff	Study Manager
Other Non-Teaching Staff	Synthetic Chemist
Other Non-Teaching Staff	Technical Director
Other Non-Teaching Staff	Technician
Other Non-Teaching Staff	Technical Manager
Other Non-Teaching Staff	Technical Officer
Other Non-Teaching Staff	Technician
Other Non-Teaching Staff	Training Consultant
Other Non-Teaching Staff	Tumuaki
Other Non-Teaching Staff	Veterinarian
Other Non-Teaching Staff	Visiting Fellow
Other Non-Teaching Staff	William Evans Visiting Playwright
Other Non-Teaching Staff	Writer in Residence
Other Non-Teaching Staff	Senior Research Lecturer ATB
Other Non-Teaching Staff	Technician 3
Other Teaching Staff	Acting Head of Department
Other Teaching Staff	Assistant Lecturer
Other Teaching Staff	Academic Clinical Head of Department

Other Teaching Staff	Academic Fellow
Other Teaching Staff	Academic Head of Department
Other Teaching Staff	Academic Leader
Other Teaching Staff	Academic Leader Teaching Experience
Other Teaching Staff	Academic Other
Other Teaching Staff	Acting Academic Head of Department
Other Teaching Staff	Acting Head of Department
Other Teaching Staff	Assistant Lecturer
Other Teaching Staff	Canterbury Health Chair in Colorectal Surgery
Other Teaching Staff	Clinical Educator
Other Teaching Staff	Clinical Laboratory Snr Tutor
Other Teaching Staff	Clinical Tutor
Other Teaching Staff	Course Co-Ordinator
Other Teaching Staff	Curriculum Leader
Other Teaching Staff	Deputy HOD
Other Teaching Staff	Deputy Head of Department
Other Teaching Staff	FX Academic (Teaching)
Other Teaching Staff	FX Academic-Teaching and Admin
Other Teaching Staff	Fixed Term Academic
Other Teaching Staff	Head of Department
Other Teaching Staff	Head of Section
Other Teaching Staff	HOD
Other Teaching Staff	Head of Department
Other Teaching Staff	Head of Discipline
Other Teaching Staff	Joint Head of Discipline
Other Teaching Staff	Limited Teaching and Other Duties
Other Teaching Staff	Limited Term Tutor
Other Teaching Staff	Mentor Academic
Other Teaching Staff	Programme Coordinator
Other Teaching Staff	Physiotherapist (Clinical Tutor)
Other Teaching Staff	Research and Teaching Academic
Other Teaching Staff	Research and Teaching Fellow
Other Teaching Staff	Research/Teaching Fellow
Other Teaching Staff	Researcher/FX Academic-Teaching and Admin
Other Teaching Staff	Senior Tutor
Other Teaching Staff	Supernumerary Asst Lecturer
Other Teaching Staff	Senior English Language Teacher
Other Teaching Staff	Senior Teaching Fellow
Other Teaching Staff	Senior Teaching Fellow (Course Co-ordinator)
Other Teaching Staff	Senior Tutor
Other Teaching Staff	Senior Tutor (Fixed Term)
Other Teaching Staff	Supernumerary Assistant Lecturer
Other Teaching Staff	Supernumerary Assistant Lecturer
Other Teaching Staff	Supernumerary Assistant Lecturer
Other Teaching Staff	Supernumerary Asst Lecturer
Other Teaching Staff	Teaching Consultant
Other Teaching Staff	Tutor
Other Teaching Staff	Teaching Assistant
Other Teaching Staff	Teaching Clinician
Other Teaching Staff	Teaching Fellow
Other Teaching Staff	Technical Tutor
Other Teaching Staff	Tutor
Other Teaching Staff	Visiting Academic
Other Teaching Staff	Visiting Senior Tutor
Professor	Clinical Professor
Professor	Distinguished Professor
Professor	Foundation Prof Pacific Studies
Professor	Professor
Professor	Professor & Co Principal
Professor	Professor & Co-Principal
Professor	Professor & HOS
Professor	Professor and HOD
Professor	Prof of Business Management

Professor	Prof of Resource Economics
Professor	Prof of Soil & Environmental Sc
Professor	Prof-Food Safety-Public Health
Professor	Professional Practice Fellow
Professor	Professional Programmes Director
Professor	Professor & Co -Director
Professor	Professor & Co-Director
Professor	Professor Clinical
Professor	Professor and HOD
Professor	Professor and Head of School
Professor	Professor in Nursing
Professor	Professor of Dairy Production
Professor	Professor of Economics
Professor	Professor/ Head of Department
Professor	Professor/ Head of School
Professor	Professor/Dean
Professor	Professor/Director
Professor	Professor/Researcher
Professor	Professorial Teaching Fellow
Senior Lecturer	APM/Senior Lecturer
Senior Lecturer	Clinical Senior Lecturer
Senior Lecturer	Hourly Paid Senior Lecturer
Senior Lecturer	Lecturer/Senior Lecturer
Senior Lecturer	Senior Lecturer
Senior Lecturer	Senior Lecturer (W)
Senior Lecturer	SL in Hospitality Management
Senior Lecturer	SL in Recreation & Sport Man.
Senior Lecturer	SL in Urban Property Studies
Senior Lecturer	Sen Lec in Business Management
Senior Lecturer	Senior Lecturer (Mgmt. resp)
Senior Lecturer	Senior Lecturer ATB
Senior Lecturer	Senior Lecturer ATB (Mgmt. Resp)
Senior Lecturer	Senior Lecturer ATB (Prod Ldr)
Senior Lecturer	Senior Lecturer Above the Bar
Senior Lecturer	Senior Lecturer Clinical
Senior Lecturer	Senior Lecturer in Epidemiology
Senior Lecturer	Senior Lecturer in Finance
Senior Lecturer	Senior Lecturer in Marketing
Senior Lecturer	Senior Lecturer in Recreation
Senior Lecturer	Senior Lecturer in Recreation & Sport Mgmt.
Senior Lecturer	Senior Lecturer, Above the Bar
Senior Lecturer	Senior Lecturer/ Head of Department
Senior Lecturer	Senior Lecturer/ Head of School
Senior Lecturer	Senior Lecturer/APM
Senior Lecturer	Senior Lecturer/Director
Senior Lecturer	Senior Lecturer/Prj Manager
Senior Lecturer	Senior Lecturer ATB (Prod Ldr) LV
Senior Lecturer	Snr Lecturer
Senior Lecturer	Snr Lecturer in Wildlife Mgmt.
Senior Lecturer	Sr Lecturer / HoD
Senior Lecturer	Trans Research Snr Lecturer ATB
Senior Lecturer	Trans Research Snr Lecturer
Senior Lecturer	Visiting Senior Lecturer

Table 2.A.2: Aggregating NCEA Variable

Description	NCEA- Equivalent Measure
No formal secondary school qualification/ 0-13 NCEA level 1 credits	Less than NCEA level 3
School Certificate/ 14+ NCEA Level 1 credits/ NCEA Level 1	Less than NCEA level 3
Sixth Form certificate/ 30+ NCEA Level 2 credits	Less than NCEA level 3
University Entrance/ NCEA Level 2	Less than NCEA level 3
Higher School Certificate/ 30+ NCEA Level 3 credits	NCEA level 3 achieved
Entrance Qual from Bursary/ 42+ NCEA Level 3 credits	NCEA level 3 achieved
A or B Bursary/ NCEA Level 3	NCEA level 3 achieved
Scholarship/ NCEA Level 4	NCEA level 3 achieved
Overseas Qualification (includes International Baccalaureate)	Overseas level 3
14 or more credits at any level	Less than NCEA level 3
NCEA level 1 or school certificate	Less than NCEA level 3
NCEA level 2 or 6th form certificate	Less than NCEA level 3
University Entrance	Less than NCEA level 3
NCEA level 3 or Bursary or scholarship	NCEA level 3 achieved
Other qualification	drop

Table 2.A.3: Converting Students' Main Fields to PBRF Subject Areas

Student's Main Field	PBRF Subject Area
Audio Visual Studies	Communications, Journalism and Media Studies
Behavioural Science not elsewhere classified	Ecology, Evolution and Behaviour
Business and Commercial Law	Law
Care for People with Disabilities	Sociology, Social Policy, Social Work, Criminology and Gender Studies
Communication and Media Studies not elsewhere classified	Communications, Journalism and Media Studies
Constitutional Law	Law
Counselling	Public Health
Creative Arts not elsewhere classified	Music, Literary Arts and Other Arts
Criminal Law	Law
Criminology	Sociology, Social Policy, Social Work, Criminology and Gender Studies
Cultural Studies	Sociology, Social Policy, Social Work, Criminology and Gender Studies
Dance	Theatre and Dance, Film and Television and Multimedia
Drama and Theatre Studies	Theatre and Dance, Film and Television and Multimedia
Econometrics	Economics
English for Speakers of Other Languages	English Language and Literature
English Language	English Language and Literature
Family Law	Law
Fashion Design	Design
Fine Arts	Visual Arts and Crafts
Foreign Languages	Foreign Languages and Linguistics
Geomatic Engineering not elsewhere classified	Engineering and Technology
Geophysics	Earth Sciences
Graphic and Design Studies not elsewhere classified	Design
Graphic Arts and Design Studies	Design
Hauora (Māori Health)	Public Health
Health Education, Promotion, Counselling	Public Health

Health not elsewhere classified	Other Health Studies (including Rehabilitation Therapies)
History	History, History of Art, Classics and Curatorial Studies
Horticulture	Agriculture and Other Applied Biological Sciences
Hospitality Management	Management, Human Resources, Industrial Relations, International Business and Other Business
Human Biology	Molecular, Cellular and Whole Organism Biology
Human Movement and Sports Science	Other Health Studies (including Rehabilitation Therapies)
Human Resource Management	Management, Human Resources, Industrial Relations, International Business and Other Business
Human Welfare Studies and Services not elsewhere classified	Sociology, Social Policy, Social Work, Criminology and Gender Studies
Hydrology	Earth Sciences
Immersion Primary Teacher Training (Pre-Service)	Education
Industrial Engineering	Engineering and Technology
Industrial Relations	Management, Human Resources, Industrial Relations, International Business and Other Business
Information Systems not elsewhere classified	Computer Science, Information Technology, Information Sciences
Information Technology not elsewhere classified	Computer Science, Information Technology, Information Sciences
Inorganic Chemistry	Chemistry
Interior and Environmental Design	Architecture, Design, Planning, Surveying
International Business	Management, Human Resources, Industrial Relations, International Business and Other Business
International Law	Law
Investment and Securities	Accounting and Finance
Journalism, Communication and Media Studies	Communications, Journalism and Media Studies
Justice Administration	Law
Laboratory Technology	Biomedical
Land, Parks and Wildlife Management	Ecology, Evolution and Behaviour
Landscape Architecture	Architecture, Design, Planning, Surveying
Language and Literature not elsewhere classified	English Language and Literature
Law not elsewhere classified	Law
Learning Skills Programmes	Education
Legal Practice	Law
Legal Studies	Law
Linguistics	Foreign Languages and Linguistics
Literature	English Language and Literature
Management and Commerce not elsewhere classified	Management, Human Resources, Industrial Relations, International Business and Other Business
Manufacturing Engineering	Engineering and Technology
Manufacturing Engineering and Technology not elsewhere classified.	Engineering and Technology
Mapping Science	Engineering and Technology
Marine Science	Molecular, Cellular and Whole Organism Biology
Marketing	Marketing and Tourism
Massage Therapy	Other Health Studies (including Rehabilitation Therapies)
Materials Engineering	Engineering and Technology
Mathematical Sciences not elsewhere classified	Pure and Applied Mathematics
Mathematics	Pure and Applied Mathematics
Mechanical and Industrial Engineering & Technology not elsewhere classified	Engineering and Technology
Mechanical Engineering	Engineering and Technology
Medical Imaging Technology (Radiography) and Radiation Therapy	Other Health Studies (including Rehabilitation Therapies)
Medical Science	Clinical Medicine
Medical Studies not elsewhere classified	Other Health Studies (including Rehabilitation Therapies)

Microbiology	Molecular, Cellular and Whole Organism Biology
Midwifery	Other Health Studies (including Rehabilitation Therapies)
Multimedia Computing Science	Computer Science, Information Technology, Information Sciences
Multimedia studies	Theatre and Dance, Film and Television and Multimedia
Music	Music, Literary Arts and Other Arts
Natural and Physical Sciences not elsewhere classified	Physics
Networks and Communications	Computer Science, Information Technology, Information Sciences
Neuroscience	Molecular, Cellular and Whole Organism Biology
Ngä Mahi a Rëhia (Māori Performing Arts)	Music, Literary Arts and Other Arts
Ngä Mahi a te Whare Pora (Māori Weaving)	Māori Knowledge and Development
Nursing	Other Health Studies (including Rehabilitation Therapies)
Nutrition and Dietetics	Other Health Studies (including Rehabilitation Therapies)
Occupational Therapy	Other Health Studies (including Rehabilitation Therapies)
Oceanography	Earth Sciences
Operating Systems	Computer Science, Information Technology, Information Sciences
Optometry	Other Health Studies (including Rehabilitation Therapies)
Organic Chemistry	Chemistry
Organisation Management	Management, Human Resources, Industrial Relations, International Business and Other Business
Paramedical Studies	Other Health Studies (including Rehabilitation Therapies)
Pathology	Other Health Studies (including Rehabilitation Therapies)
Performing Arts not elsewhere classified	Music, Literary Arts and Other Arts
Personal Management Training	Management, Human Resources, Industrial Relations, International Business and Other Business
Pest and Weed Control	Agriculture and Other Applied Biological Sciences
Pharmacology	Biomedical
Pharmacy	Other Health Studies (including Rehabilitation Therapies)
Photography	Visual Arts and Crafts
Physiotherapy	Other Health Studies (including Rehabilitation Therapies)
Podiatry	Other Health Studies (including Rehabilitation Therapies)
Policy Studies	Political Science, International Relations and Public Policy
Political Science	Political Science, International Relations and Public Policy
Process and Resources Engineering not elsewhere classified	Engineering and Technology
Public Health not elsewhere classified	Public Health
Public Relations	Communications, Journalism and Media Studies
Purchasing, Warehousing and Distribution	Management, Human Resources, Industrial Relations, International Business and Other Business
Real Estate	Marketing and Tourism
Rehabilitation Therapies not elsewhere classified	Other Health Studies (including Rehabilitation Therapies)
Religious Studies	Religious Studies and Theology
Sales	Marketing and Tourism
Sales and Marketing not elsewhere classified	Marketing and Tourism
Social Work	Sociology, Social Policy, Social Work, Criminology and Gender Studies
Society and Culture not elsewhere classified	Sociology, Social Policy, Social Work, Criminology and Gender Studies
Sociology	Sociology, Social Policy, Social Work, Criminology and Gender Studies
Soil Science	Earth Sciences
Speech Pathology	Other Health Studies (including Rehabilitation Therapies)
Sport and Recreation Activities	Sport and Exercise Science
Sport and Recreation not elsewhere classified	Sport and Exercise Science

Sports Coaching, Playing, Officiating, and Instructing	Sport and Exercise Science
Structural Engineering	Engineering and Technology
Studies in Human Society not elsewhere classified	Sociology, Social Policy, Social Work, Criminology and Gender Studies
Surveying	Engineering and Technology
Systems Analysis and Design	Computer Science, Information Technology, Information Sciences
Taxation Law	Law
Te Mātauranga Māori me te Whakangungu (Māori Education)	Education
Te Reo Māori	Māori Knowledge and Development
Teacher Education not elsewhere classified	Education
Teacher Education: Early Childhood (Pre-Service)	Education
Teacher Education: General (Pre-Service)	Education
Teacher Education: Primary (Pre-Service)	Education
Teacher Education: Secondary (Pre-Service)	Education
Text and Information Processing	Management, Human Resources, Industrial Relations, International Business and Other Business
Textile Design	Design
Textile Making	Engineering and Technology
Tikanga - Māori Customs	Māori Knowledge and Development
Tourism Management	Marketing and Tourism
Tourism Studies	Marketing and Tourism
Translating and Interpreting	English Language and Literature
Urban Design and Regional Planning	Architecture, Design, Planning, Surveying
Valuation	Management, Human Resources, Industrial Relations, International Business and Other Business
Veterinary Assisting	Veterinary Studies and Large Animal Science
Veterinary Science	Veterinary Studies and Large Animal Science
Visual Arts and Crafts not elsewhere classified	Visual Arts and Crafts
Viticulture	Agriculture and Other Applied Biological Sciences
Welfare Studies	Sociology, Social Policy, Social Work, Criminology and Gender Studies
Women's Studies	Sociology, Social Policy, Social Work, Criminology and Gender Studies
Written Communication	Communications, Journalism and Media Studies
Zoology	Agriculture and Other Applied Biological Sciences
Accountancy not elsewhere classified	Accounting and Finance
Accounting	Accounting and Finance
Advertising	Marketing and Tourism
Aerospace Engineering and Technology not elsewhere classified	Engineering and Technology
Agricultural Science	Agriculture and Other Applied Biological Sciences
Aircraft Operation	Engineering and Technology
Algorithms	Computer Science, Information Technology, Information Sciences
Animal Husbandry	Agriculture and Other Applied Biological Sciences
Anthropology	Anthropology and Archaeology
Archaeology	Anthropology and Archaeology
Architecture	Architecture, Design, Planning, Surveying
Architecture and Urban Environment not elsewhere classified	Architecture, Design, Planning, Surveying
Art History	History, History of Art, Classics and Curatorial Studies
Artificial Intelligence	Computer Science, Information Technology, Information Sciences
Astronomy	Physics
Atmospheric Sciences	Earth Sciences

Banking and Finance	Accounting and Finance
Banking, Finance and Related Fields not elsewhere classified	Accounting and Finance
Bilingual Primary Teacher Training (Pre-Service)	Education
Biochemistry and Cell Biology	Molecular, Cellular and Whole Organism Biology
Biological Sciences not elsewhere classified	Agriculture and Other Applied Biological Sciences
Botany	Agriculture and Other Applied Biological Sciences
Building Construction Economics (including Quantity Surveying)	Architecture, Design, Planning, Surveying
Building Science and Technology	Architecture, Design, Planning, Surveying
Building Services Engineering	Engineering and Technology
Business and Management not elsewhere classified	Management, Human Resources, Industrial Relations, International Business and Other Business
Business Management	Management, Human Resources, Industrial Relations, International Business and Other Business
Chemical Engineering	Engineering and Technology
Chemical Sciences not elsewhere classified	Chemistry
Civil Engineering not elsewhere classified	Engineering and Technology
Classics	Sociology, Social Policy, Social Work, Criminology and Gender Studies
Communications Technologies	Engineering and Technology
Community Health	Public Health
Computational Theory	Computer Science, Information Technology, Information Sciences
Computer Applications and Programming	Computer Science, Information Technology, Information Sciences
Computer Engineering	Engineering and Technology
Computer Science not elsewhere classified	Computer Science, Information Technology, Information Sciences
Conceptual Modelling	Computer Science, Information Technology, Information Sciences
Construction Engineering	Engineering and Technology
Crop Production	Agriculture and Other Applied Biological Sciences
Curriculum Studies	Education
Data Structures	Computer Science, Information Technology, Information Sciences
Database Management	Computer Science, Information Technology, Information Sciences
Decision Support Systems	Computer Science, Information Technology, Information Sciences
Dental Hygiene and Therapy	Dentistry
Dental Studies not elsewhere classified	Dentistry
Dental Technology	Dentistry
Earth Sciences not elsewhere classified	Earth Sciences
Ecology and Evolution	Ecology, Evolution and Behaviour
Education Studies	Education
Electrical and Electronic Engineering and Technology not elsewhere classified	Engineering and Technology
Electrical Engineering	Engineering and Technology
Electronic Engineering	Engineering and Technology
Engineering and Related Technologies not elsewhere classified	Engineering and Technology
English Language Teaching (ESOL/EFL)	Education
Environmental Engineering	Engineering and Technology
Environmental Studies not elsewhere classified	Agriculture and Other Applied Biological Sciences
Farm Management and Agribusiness	Management, Human Resources, Industrial Relations, International Business and Other Business

Food (excluding Seafood) Processing Technology	Engineering and Technology
Food Science and Biotechnology	Agriculture and Other Applied Biological Sciences
Forestry Studies	Agriculture and Other Applied Biological Sciences
Formal Language Theory	Computer Science, Information Technology, Information Sciences
Garment Making	Engineering and Technology
General Medicine	Clinical Medicine
Genetics	Agriculture and Other Applied Biological Sciences
Geology	Earth Sciences

Table 2.A.4: Aggregation of Subject Areas

S.No.	Subject Area	Aggregation
1	Accounting and Finance	Professions
2	Agriculture and Other Applied Biological Sciences	Natural Sciences
3	Anthropology and Archaeology	Social Sciences
4	Architecture, Design, Planning, Surveying	Professions
5	Biomedical	Natural Sciences
6	Chemistry	Natural Sciences
7	Clinical Medicine	Professions
8	Communications, Journalism and Media Studies	Social Sciences
9	Computer Science, Information Technology, Information Sciences	Other
10	Dentistry	Professions
11	Design	Professions
12	Earth Sciences	Natural Sciences
13	Ecology, Evolution and Behaviour	Natural Sciences
14	Economics	Social Sciences
15	Education	Professions
16	Engineering and Technology	Professions
17	English Language and Literature	Humanities
18	Foreign Languages and Linguistics	Humanities
19	History, History of Art, Classics and Curatorial Studies	Humanities
20	Human Geography	Social Sciences
21	Law	Professions
22	Management, Human Resources, Industrial Relations, International Business and Other Business	Other
23	Marketing and Tourism	Other
24	Molecular, Cellular and Whole Organism Biology	Natural Sciences
25	Music, Literary Arts and Other Arts	Humanities
26	Māori Knowledge and Development	Humanities
27	Nursing	Professions
28	Other Health Studies (including Rehabilitation Therapies)	Professions
29	Pharmacy	Professions
30	Philosophy	Humanities
31	Physics	Natural Sciences
32	Political Science, International Relations and Public Policy	Social Sciences
33	Psychology	Social Sciences
34	Public Health	Social Sciences
35	Pure and Applied Mathematics	Other
36	Religious Studies and Theology	Humanities
37	Sociology, Social Policy, Social Work, Criminology and Gender Studies	Social Sciences
38	Sport and Exercise Science	Professions
39	Statistics	Other
40	Theatre and Dance, Film and Television and Multimedia	Humanities
41	Veterinary Studies and Large Animal Science	Professions
42	Visual Arts and Crafts	Humanities

Appendix 2B: Descriptive Statistics of Academics and Students; Variability in Pass Rates

Table 2.B.1: Descriptive Statistics of Academics

PBRF Wave	2003		2012	
	Freq.	Percent	Freq.	Percent
Quality category				
A	338	7.15	721	13.32
B	1,167	24.68	2,131	39.38
C	1,613	34.12	1,534	28.35
C(NE)	--	--	745	13.77
R	712	15.06	201	3.71
Researcher's position title				
Professor	422	8.93	841	15.54
Associate Professor	441	9.33	818	15.12
Senior Lecturer	1,509	31.92	1,804	33.34
Lecturer	1,079	22.82	823	15.21
Other Teaching Staff	450	9.52	106	1.96
Other Non-Teaching Staff	827	17.49	1,019	18.83
Researcher's gender				
Female	1,578	33.38	2,121	39.2
Male	2,613	55.27	3,280	60.62
Unknown	537	11.36	10	0.18
Researcher's age band				
20 to 29	202	4.27	106	1.96
30 to 39	965	20.41	1,094	20.22
40 to 49	1,264	26.73	1,560	28.83
50 to 59	1,177	24.89	1,450	26.8
60 to 69	447	9.45	934	17.26
70 and over	5	0.11	103	1.9
Unknown	668	14.13	164	3.03
Researcher ethnicity				
Asian	192	4.06	463	8.56
European	2,003	42.36	3,225	59.6
Māori	164	3.47	227	4.2
Middle Eastern/Latin American/African	-	-	53	0.98
Not Stated	1,935	40.93	900	16.63
Other Ethnicity	406	8.59	461	8.52
Pasifika	28	0.59	82	1.52
Total	4,728	100	5,411	100

Table 2.B.2: Descriptive Statistics of Students

	First Year: 1998/1999		First Year: 2007/2008	
Pass Rate	**Freq.**	**Percent**	**Freq.**	**Percent**
0-19	141	1.98	312	1.03
20-39	159	2.23	375	1.24
40-59	354	4.96	957	3.16
60-79	774	10.85	3,120	10.31
80-84	363	5.09	1,572	5.20
85-89	423	5.93	2,286	7.56
90-94	618	8.66	3,099	10.24
95-99	534	7.49	3,711	12.27
100	3,768	52.82	14,820	48.99
Gender				
Male	3,456	48.48	12,579	41.58
Female	3,672	51.52	17,676	58.42
Ethnicity				
European/Pākehā	5,055	71.49	21,816	72.52
Māori	438	6.19	939	3.12
Pasifika	240	3.39	849	2.82
Asian	1,089	15.40	5,607	18.64
MELAA (Middle Eastern/Latin American/African)			294	0.98
Other	249	3.52	579	1.92
Age Category				
15-20	5,754	80.72	26,556	87.77
20-30	1,185	16.62	3,408	11.26
30-40	135	1.89	180	0.59
40-50	48	0.67	84	0.28
50-60	6	0.08	24	0.08
60-70	--	--	6	0.02
School Decile				
1	156	2.19	540	1.79
2	231	3.24	693	2.29
3	447	6.27	1,698	5.61
4	597	8.38	2,415	7.98
5	603	8.46	1,797	5.94
6	840	11.78	3,783	12.50
7	801	11.24	3,870	12.79
8	813	11.41	3,924	12.97
9	1,038	14.56	5,535	18.30
10	1,566	21.97	5,805	19.19
Unknown	36	0.51	192	0.63
Total	7,407	100	30,663	100

Table 2.B.3: Variability in Pass Rates

	First Year: 1998/1999		First Year: 2007/2008	
Pass Rate	**Freq.**	**Percent**	**Freq.**	**Percent**
0-19	141	1.98	312	1.03
20-39	159	2.23	375	1.24
40-59	354	4.96	957	3.16
60-79	774	10.85	3120	10.31
80-84	363	5.09	1572	5.20
85-89	423	5.93	2286	7.56
90-94	618	8.66	3099	10.24
95-99	534	7.49	3711	12.27
100	3768	52.82	14820	48.99
Pass Rate				
Mean	90.31			
Standard Deviation	16.82			
Total	7134	100	30252	100

Appendix 2C: Determinants of Student Pass Rates; Alternative Model Specifications – Tobit Estimation for PBRF Waves 2003 and 2012; OLS Estimation and Tobit Estimation without Departmental Controls

Table 2.C.1: Determinants of Student Pass Rates; Alternative Model Specifications – PBRF Wave 2003 (Tobit)

	Coefficient	Robust S.E.
PBRF Outcomes		
Proportion of academics attaining PBRF rank A	-0.101	0.154
Proportion of academics attaining PBRF rank B	-0.060	0.079
Proportion of academics attaining PBRF rank C(NE)	n.a.	n.a.
Proportion of academics attaining PBRF rank R	0.044	0.093
Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave	-0.145	0.085
Department Level Characteristics		
Researcher's Position Title		
Proportion of Professors	-0.028	0.135
Proportion of Associate Professors	0.130	0.096
Proportion of Lecturers	-0.122	0.092
Proportion of Other Teaching Staff	0.074	0.131
Proportion of Other Non-Teaching Staff	-0.008	0.087
Researcher's Gender		
Proportion of female academics	-0.041	.
Proportion of academics for whom gender is unknown	0.477	0.301
Researcher's Age Band		
Proportion of academics in the age band of 20 to 29	0.185	0.173
Proportion of academics in the age band of 40 to 49	-0.069	0.088
Proportion of academics in the age band of 50 to 59	0.149	0.093
Proportion of academics in the age band of 60 to 69	0.052	0.123
Proportion of academics in the age band of 70 and Over	-0.591	2.047
Proportion of academics for whom age band is unknown	0.112	0.078
Researcher's Ethnicity		
Proportion of Asian academics	-0.174	0.135
Proportion of Māori academics	-0.030	0.139
Proportion of Pasifika academics	-0.390	0.408
Proportion of Middle Eastern/Latin American/African academics	n.a.	n.a.
Proportion of academics belonging to "other ethnicity"	0.093	0.091
Proportion of academics for whom ethnicity is unknown	0.038	.
Student Level Characteristics		
Student's gender		
Female student	8.540***	1.147
Student's ethnicity		
Asian student	-17.556***	1.598
Māori student	-16.080***	1.906

Pasifika student	-30.711***	2.517
Middle Eastern/Latin American/African student	n.a.	n.a.
Student belonging to “other ethnicity”	-11.400***	2.299
Student for whom ethnicity is unknown	-14.854***	4.209
Student’s high school decile		
School decile 1	-5.601	3.160
School decile 2	-2.323	2.365
School decile 3	-4.058	2.097
School decile 4	-2.809	2.177
School decile 6	-0.629	1.959
School decile 7	-0.595	1.835
School decile 8	0.851	2.116
School decile 9	3.917*	1.789
School decile 10	3.161	1.773
School decile missing	8.832	6.800
Level of NCEA achieved by the student		
Achieved less than NCEA level 3	-4.421***	1.311
Overseas equivalent to NCEA level 3	-8.498	5.208
Missing observations on NCEA level achieved	-10.928***	2.587
University fixed effects		
University 2	-20.457**	6.573
University 3	-20.648**	6.915
University 4	-70.875*	29.377
University 5	-32.398***	7.458
University 6	-29.096***	5.956
University 7	-7.034	5.499
University 8	-27.452***	6.707
Subject Area fixed effects		
Agriculture and Other Applied Biological Sciences	-0.002	5.060
Anthropology and Archaeology	-10.666	7.509
Architecture, Design, Planning, Surveying	19.362***	3.808
Biomedical	6.339	5.709
Chemistry	-15.506*	7.338
Clinical Medicine	55.677***	3.421
Communications, Journalism and Media Studies	5.256	5.895
Computer Science, Information Technology, Information Sciences	-3.700	3.079
Dentistry	31.772***	4.820
Design	19.530**	6.290
Earth Sciences	-4.089	5.760
Ecology, Evolution and Behaviour	-0.505	5.904
Economics	-5.063	3.555
Education	10.062**	3.911
Engineering and Technology	7.244	5.491
English Language and Literature	-5.478	3.644

Foreign Languages and Linguistics	5.444	4.972
History, History of Art, Classics and Curatorial Studies	-11.358**	4.350
Human Geography	1.855	6.621
Law	16.467***	3.195
Management, Human Resources, Industrial Relations, International Business and Other Business	-0.753	3.473
Marketing and Tourism	5.299	3.032
Molecular, Cellular and Whole Organism Biology	-3.905	4.639
Music, Literary Arts and Other Arts	4.653	10.470
Māori Knowledge and Development	21.153	12.805
Other Health Studies (including Rehabilitation Therapies)	23.191***	4.590
Philosophy	-9.807	5.756
Physics	-3.268	5.011
Political Science, International Relations and Public Policy	-4.870	6.409
Psychology	-3.676	4.231
Public Health	12.375	13.867
Pure and Applied Mathematics	-15.819***	3.817
Religious Studies and Theology	-2.780	8.064
Sociology, Social Policy, Social Work, Criminology and Gender Studies	-8.535	5.524
Sport and Exercise Science	-0.358	4.870
Statistics	-11.566*	4.777
Theatre and Dance, Film and Television and Multimedia	-9.044	7.941
Veterinary Studies and Large Animal Science	22.384***	3.673
Visual Arts and Crafts	28.421***	8.157
Year fixed effects		
First year at the tertiary education institute of the student – 1999	2.266*	1.023
constant	118.535***	10.322
Number of observations	7,131	

Notes: (1) The dependent variable is the pass rate of the student. (2) The robust standard errors which are clustered on the id (id is composed of evaluation year, university, and subject area) level. Standard errors are adjusted for 258 clusters in id. (3) The omitted category variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (4) The omitted category variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. I have estimated all the coefficients by using university, subject area, and year fixed effects. (5) I am not allowed to identify specific universities due to the 5.14.2 confidentiality entity clause set by Stats NZ. (6) Significance levels are indicated by: * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$.

Table 2.C.2: Determinants of Student Pass Rates; Alternative Model Specifications – PBRF Wave 2012 (Tobit)

	Coefficient	Robust S.E.
PBRF Outcomes		
Proportion of academics attaining PBRF rank A	0.028	0.076
Proportion of academics attaining PBRF rank B	-0.019	0.045
Proportion of academics attaining PBRF rank C(NE)	-0.087	0.060
Proportion of academics attaining PBRF rank R	-0.101	0.098
Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave	n.a.	n.a.
Department Level Characteristics		
Researcher's Position Title		
Proportion of Professors	0.030	0.065
Proportion of Associate Professors	-0.033	0.064
Proportion of Lecturers	0.016	0.045
Proportion of Other Teaching Staff	0.247	0.143
Proportion of Other Non-Teaching Staff	0.083	0.057
Researcher's Gender		
Proportion of female academics	0.045	0.037
Proportion of academics for whom gender is unknown	0.192	0.394
Researcher's Age Band		
Proportion of academics in the age band of 20 to 29	-0.080	0.183
Proportion of academics in the age band of 40 to 49	-0.038	.
Proportion of academics in the age band of 50 to 59	-0.146**	0.048
Proportion of academics in the age band of 60 to 69	0.061	0.056
Proportion of academics in the age band of 70 and Over	-0.250	0.159
Proportion of academics for whom age band is unknown	0.042	0.064
Researcher's Ethnicity		
Proportion of Asian academics	-0.084	0.070
Proportion of Māori academics	-0.086	0.052
Proportion of Pasifika academics	0.046	0.124
Proportion of Middle Eastern/Latin American/African academics	-0.149	0.196
Proportion of academics belonging to "other ethnicity"	-0.037	0.057
Proportion of academics for whom ethnicity is unknown	-0.055	0.047
Student Level Characteristics		
Student's gender		
Female student	6.436***	0.530
Student's ethnicity		
Asian student	-7.915***	0.787
Māori student	-12.056***	0.924
Pasifika student	-21.394***	1.219
Middle Eastern/Latin American/African student	-11.719***	1.316
Student belonging to "other ethnicity"	-5.653***	1.090

Student for whom ethnicity is unknown	-2.683	2.942
Student's high school decile		
School decile 1	-6.073***	1.368
School decile 2	-3.592**	1.244
School decile 3	-0.147	0.830
School decile 4	-0.600	0.802
School decile 6	0.594	0.747
School decile 7	0.859	0.756
School decile 8	1.707*	0.715
School decile 9	0.982	0.738
School decile 10	2.257**	0.711
School decile missing	0.367	2.178
Level of NCEA achieved by the student		
Achieved less than NCEA level 3	-6.751***	0.825
Overseas equivalent to NCEA level 3	3.100***	0.892
Missing observations on NCEA level achieved	-7.177**	2.280
University fixed effects		
University 2	-10.623***	2.959
University 3	-10.271***	2.252
University 4	-6.178**	2.237
University 5	-16.935***	2.253
University 6	-15.375***	2.148
University 7	-4.711*	1.886
University 8	-15.780***	2.690
Subject Area fixed effects		
Agriculture and Other Applied Biological Sciences	1.190	3.406
Anthropology and Archaeology	-12.604***	3.325
Architecture, Design, Planning, Surveying	11.819***	2.756
Biomedical	0.811	4.608
Chemistry	-12.485***	3.656
Clinical Medicine	30.510***	2.628
Communications, Journalism and Media Studies	-0.648	3.926
Computer Science, Information Technology, Information Sciences	-9.193***	2.463
Dentistry	16.937***	2.676
Design	19.495***	4.209
Earth Sciences	-2.933	3.578
Ecology, Evolution and Behaviour	-5.161	3.976
Economics	-1.799	2.016
Education	3.984	3.058
Engineering and Technology	2.450	3.356
English Language and Literature	-5.254	2.839
Foreign Languages and Linguistics	-3.351	3.147
History, History of Art, Classics and Curatorial Studies	-5.035*	2.445

Human Geography	-5.622	3.899
Law	5.269	2.834
Management, Human Resources, Industrial Relations, International Business and Other Business	-5.967*	2.537
Marketing and Tourism	-1.406	2.102
Molecular, Cellular and Whole Organism Biology	-7.092	3.803
Music, Literary Arts and Other Arts	0.991	4.740
Māori Knowledge and Development	-7.388	5.042
Other Health Studies (including Rehabilitation Therapies)	7.292*	3.399
Philosophy	-12.384***	3.030
Physics	-3.366	3.550
Political Science, International Relations and Public Policy	-4.387	2.900
Psychology	-4.391	3.449
Public Health	-7.917	4.610
Pure and Applied Mathematics	-12.078***	2.982
Religious Studies and Theology	-7.356*	3.141
Sociology, Social Policy, Social Work, Criminology and Gender Studies	-8.591**	2.859
Sport and Exercise Science	-0.461	2.788
Statistics	-18.085***	3.525
Theatre and Dance, Film and Television and Multimedia	0.084	4.321
Veterinary Studies and Large Animal Science	3.476	3.699
Visual Arts and Crafts	10.378**	3.823
Year fixed effects		
First year at the tertiary education institute of the student – 2008	-0.081	0.353
constant	116.236***	5.398
Number of observations	30,252	

Notes: (1) The dependent variable is the pass rate of the student. (2) The robust standard errors which are clustered on the id (id is composed of evaluation year, university, and subject area) level. Standard errors are adjusted for 273 clusters in id. (3) The omitted category variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (4) The omitted category variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. I have estimated all the coefficients by using university, subject area, and year fixed effects. (5) I am not allowed to identify specific universities due to the 5.14.2 confidentiality entity clause set by Stats NZ. (6) Significance levels are indicated by: * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$.

Table 2.C.3: Determinants of Student Pass Rates; Alternative Model Estimators – OLS Model

	Coefficient	Robust Standard Error
PBRF Outcomes		
Proportion of academics attaining PBRF rank A	0.017	0.034
Proportion of academics attaining PBRF rank B	-0.008	0.021
Proportion of academics attaining PBRF rank C(NE)	0.000	0.032
Proportion of academics attaining PBRF rank R	0.008	0.031
Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave	0.003	0.027
Department Level Characteristics		
Researcher's Position Title		
Proportion of Professors	0.022	0.032
Proportion of Associate Professors	-0.030	0.031
Proportion of Lecturers	-0.022	0.021
Proportion of Other Teaching Staff	0.026	0.048
Proportion of Other Non-Teaching Staff	0.002	0.025
Researcher's Gender		
Proportion of female academics	0.019	0.017
Proportion of academics for whom gender is unknown	-0.028	0.034
Researcher's Age Band		
Proportion of academics in the age band of 20 to 29	0.021	0.079
Proportion of academics in the age band of 40 to 49	-0.029	0.022
Proportion of academics in the age band of 50 to 59	-0.051*	0.023
Proportion of academics in the age band of 60 to 69	-0.009	0.028
Proportion of academics in the age band of 70 and Over	-0.076	0.083
Proportion of academics for whom age band is unknown	0.005	0.034
Researcher's Ethnicity		
Proportion of Asian academics	-0.038	0.030
Proportion of Māori academics	-0.023	0.027
Proportion of Pasifika academics	0.015	0.066
Proportion of Middle Eastern/Latin American/African academics	-0.037	0.111
Proportion of academics belonging to "other ethnicity"	0.001	0.024
Proportion of academics for whom ethnicity is unknown	0.015	0.019
Student Level Characteristics		
Student's gender		
Female student	3.298***	0.286
Student's ethnicity		
Asian student	-4.202***	0.418
Māori student	-6.442***	0.575
Pasifika student	-13.125***	0.900
Middle Eastern/Latin American/African student	-6.308***	0.901
Student belonging to "other ethnicity"	-2.993***	0.529

Student for whom ethnicity is unknown	-0.742	1.229
Student's high school decile		
School decile 1	-3.527***	0.905
School decile 2	-2.112**	0.700
School decile 3	-0.336	0.423
School decile 4	-0.416	0.434
School decile 6	0.215	0.376
School decile 7	0.558	0.361
School decile 8	1.115**	0.355
School decile 9	1.056**	0.356
School decile 10	1.396***	0.336
School decile missing	0.196	1.006
Level of NCEA achieved by the student		
Achieved less than NCEA level 3	-3.993***	0.407
Overseas equivalent to NCEA level 3	1.057**	0.381
Missing observations on NCEA level achieved	-4.694***	1.162
University fixed effects		
University 2	-5.377***	1.408
University 3	-5.343***	1.141
University 4	-2.431	1.249
University 5	-9.079***	1.378
University 6	-9.306***	1.381
University 7	-1.338	1.154
University 8	-8.508***	1.460
Subject Area fixed effects		
Agriculture and Other Applied Biological Sciences	0.732	1.435
Anthropology and Archaeology	-7.835***	1.822
Architecture, Design, Planning, Surveying	4.871***	1.109
Biomedical	2.786	2.066
Chemistry	-7.607***	1.554
Clinical Medicine	11.215***	1.293
Communications, Journalism and Media Studies	-0.321	1.621
Computer Science, Information Technology, Information Sciences	-5.307***	1.069
Dentistry	9.845***	1.182
Design	3.609**	1.327
Earth Sciences	-0.956	1.585
Ecology, Evolution and Behaviour	-2.035	1.854
Economics	-1.652	0.935
Education	2.209	1.173
Engineering and Technology	1.726	1.856
English Language and Literature	-2.941**	1.120
Foreign Languages and Linguistics	-2.066	1.231
History, History of Art, Classics and Curatorial Studies	-4.411***	1.182
Human Geography	-0.677	1.760

Law	4.667***	1.245
Management, Human Resources, Industrial Relations, International Business and Other Business	-2.839*	1.391
Marketing and Tourism	0.028	0.857
Molecular, Cellular and Whole Organism Biology	-3.954*	1.888
Music, Literary Arts and Other Arts	0.177	2.225
Māori Knowledge and Development	-3.240	2.866
Other Health Studies (including Rehabilitation Therapies)	4.491***	1.396
Philosophy	-8.570***	1.809
Physics	-2.928	1.583
Political Science, International Relations and Public Policy	-3.252*	1.467
Psychology	-2.434	1.372
Public Health	-0.213	2.459
Pure and Applied Mathematics	-10.027***	1.462
Religious Studies and Theology	-5.066**	1.652
Sociology, Social Policy, Social Work, Criminology and Gender Studies	-5.396***	1.542
Sport and Exercise Science	1.164	1.441
Statistics	-10.182***	1.316
Theatre and Dance, Film and Television and Multimedia	-2.094	2.060
Veterinary Studies and Large Animal Science	4.403**	1.454
Visual Arts and Crafts	4.622***	1.339
Year fixed effects		
First year at the tertiary education institute of the student – 1999	1.663***	0.506
First year at the tertiary education institute of the student – 2007	3.958**	1.346
First year at the tertiary education institute of the student – 2008	3.815**	1.343
constant	94.512***	2.856
Number of observations	37,383	

Notes: (1) The dependent variable is the *pass rate* of the student. (2) The robust standard errors which are clustered on the *id* (*id* is composed of evaluation year, university, and subject area) level. Standard errors are adjusted for 531 clusters in *id*. (3) The omitted category variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (4) The omitted category variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. I have estimated all the coefficients by using university, subject area, and year fixed effects. (5) I am not allowed to identify specific universities due to the 5.14.2 confidentiality entity clause set by Stats NZ. (6) Significance levels are indicated by: * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$.

Table 2.C.4: Determinants of Student Pass Rates; Alternative Model Specifications (Tobit Model without Departmental Controls)

	Coefficient	Robust Standard Error
PBRF Outcomes		
Proportion of academics attaining PBRF rank A	0.051	0.050
Proportion of academics attaining PBRF rank B	-0.011	0.038
Proportion of academics attaining PBRF rank C(NE)	0.009	0.051
Proportion of academics attaining PBRF rank R	0.026	0.061
Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave	0.015	0.055
Student Level Characteristics		
Student's gender		
Female student	6.859***	0.495
Student's ethnicity		
Asian student	-9.545***	0.804
Māori student	-12.806***	0.856
Pasifika student	-23.141***	1.167
Middle Eastern/Latin American/African student	-12.711***	1.321
Student belonging to "other ethnicity"	-7.345***	0.989
Student for whom ethnicity is unknown	-4.616	2.460
Student's high school decile		
School decile 1	-5.740***	1.281
School decile 2	-3.561***	1.121
School decile 3	-0.644	0.790
School decile 4	-0.784	0.766
School decile 6	0.457	0.718
School decile 7	0.752	0.709
School decile 8	1.809**	0.681
School decile 9	1.451*	0.683
School decile 10	2.729***	0.660
School decile missing	1.753	2.076
Level of NCEA achieved by the student		
Achieved less than NCEA level 3	-6.197***	0.711
Overseas equivalent to NCEA level 3	2.426**	0.914
Missing observations on NCEA level achieved	-8.600***	1.698
University fixed effects		
University 2	-10.483***	2.533
University 3	-10.176***	2.732
University 4	-5.182*	2.237
University 5	-17.223***	2.339
University 6	-17.470***	2.324
University 7	-4.307*	2.174
University 8	-15.116***	2.278

Subject Area fixed effects		
Agriculture and Other Applied Biological Sciences	2.539	1.736
Anthropology and Archaeology	-10.002***	2.023
Architecture, Design, Planning, Surveying	13.815***	1.914
Biomedical	5.200	4.685
Chemistry	-7.046**	2.237
Clinical Medicine	39.008***	3.755
Communications, Journalism and Media Studies	1.943	3.252
Computer Science, Information Technology, Information Sciences	-6.973***	1.309
Dentistry	23.318***	1.535
Design	19.651***	4.839
Earth Sciences	1.107	2.838
Ecology, Evolution and Behaviour	-0.704	2.485
Economics	-1.628	1.491
Education	7.688***	1.404
Engineering and Technology	4.550	3.775
English Language and Literature	-1.786	1.319
Foreign Languages and Linguistics	-0.107	2.461
History, History of Art, Classics and Curatorial Studies	-4.833**	1.580
Human Geography	1.309	1.966
Law	9.865***	1.918
Management, Human Resources, Industrial Relations, International Business and Other Business	-4.155*	2.054
Marketing and Tourism	0.361	1.402
Molecular, Cellular and Whole Organism Biology	-0.353	2.244
Music, Literary Arts and Other Arts	3.490	3.187
Māori Knowledge and Development	-3.796	2.525
Other Health Studies (including Rehabilitation Therapies)	14.151***	2.566
Philosophy	-12.180***	2.131
Physics	-1.370	2.328
Political Science, International Relations and Public Policy	-2.072	2.218
Psychology	-1.758	1.610
Public Health	0.620	3.794
Pure and Applied Mathematics	-11.574***	2.240
Religious Studies and Theology	-7.063*	2.962
Sociology, Social Policy, Social Work, Criminology and Gender Studies	-6.761***	1.444
Sport and Exercise Science	1.155	1.484
Statistics	-14.514***	1.905
Theatre and Dance, Film and Television and Multimedia	2.191	3.282
Veterinary Studies and Large Animal Science	12.698***	3.972
Visual Arts and Crafts	15.271***	3.552

Year fixed effects		
First year at the tertiary education institute of the student – 1999	1.880	1.010
First year at the tertiary education institute of the student – 2007	1.530	1.782
First year at the tertiary education institute of the student – 2008	1.379	1.749
constant	106.720***	3.186
Number of observations	37,383	

Notes: (1) The dependent variable is the *pass rate* of the student. (2) The robust standard errors which are clustered on the *id* (*id* is composed of evaluation year, university, and subject area) level. Standard errors are adjusted for 531 clusters in *id*. (3) The omitted category variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (4) The omitted category variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. I have estimated all the coefficients by using university, subject area, and year fixed effects. (5) I am not allowed to identify specific universities due to the 5.14.2 confidentiality entity clause set by Stats NZ. (6) Significance levels are indicated by: * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$.

Appendix 2D: Determinants of Student Pass Rates; Alternative Model Specifications – Likelihood of Passing 75%, 80%, 90% and 95% of Courses (Probit Model)

Table 2.D.1: Determinants of Student Pass Rates; Alternative Model Specifications and Estimators: Likelihood of passing 75% of the courses (Probit Model)

	dy/dx	Standard Error
PBRF Outcomes		
Proportion of academics attaining PBRF rank A	0.000	0.000
Proportion of academics attaining PBRF rank B	0.000	0.000
Proportion of academics attaining PBRF rank C(NE)	0.000	0.000
Proportion of academics attaining PBRF rank R	-0.000	0.000
Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave	0.000	0.000
Department Level Characteristics		
Researcher's Position Title		
Proportion of Professors	0.000	0.000
Proportion of Associate Professors	0.000	0.000
Proportion of Lecturers	0.000	0.000
Proportion of Other Teaching Staff	0.000	0.001
Proportion of Other Non-Teaching Staff	0.000	0.000
Researcher's Gender		
Proportion of female academics	0.000	0.000
Proportion of academics for whom gender is unknown	-0.001	0.000
Researcher's Age Band		
Proportion of academics in the age band of 20 to 29	0.001	0.001
Proportion of academics in the age band of 40 to 49	-0.0006*	0.000
Proportion of academics in the age band of 50 to 59	-0.0009**	0.000
Proportion of academics in the age band of 60 to 69	-0.001	0.000
Proportion of academics in the age band of 70 and Over	-0.0019*	0.001
Proportion of academics for whom age band is unknown	0.000	0.000
Researcher's Ethnicity		
Proportion of Asian academics	-0.001	0.000
Proportion of Māori academics	0.000	0.000
Proportion of Pasifika academics	0.000	0.001
Proportion of Middle Eastern/Latin American/African academics	-0.001	0.001
Proportion of academics belonging to "other ethnicity"	0.000	0.000
Proportion of academics for whom ethnicity is unknown	0.000	0.000
Student Level Characteristics		
Student's gender		
Female student	0.0477***	0.004
Student's ethnicity		
Asian student	-0.0679***	-0.006

Māori student	-0.0787***	-0.008
Pasifika student	-0.1454***	-0.010
Middle Eastern/Latin American/African student	-0.0819***	0.016
Student belonging to “other ethnicity”	-0.0396***	0.010
Student for whom ethnicity is unknown	0.020	0.022
Student’s high school decile		
School decile 1	-0.0425***	0.013
School decile 2	-0.0244*	0.010
School decile 3	-0.004	0.008
School decile 4	-0.008	0.009
School decile 6	0.004	0.007
School decile 7	0.012	0.007
School decile 8	0.0180*	0.007
School decile 9	0.0177**	0.007
School decile 10	0.0246***	0.007
School decile missing	0.015	0.022
Level of NCEA achieved by the student		
Achieved less than NCEA level 3	-0.0469***	-0.004
Overseas equivalent to NCEA level 3	0.0340**	0.011
Missing observations on NCEA level achieved	-0.0595***	0.014
University fixed effects		
University 2	-0.0485***	0.015
University 3	-0.0575***	0.010
University 4	-0.0234**	0.008
University 5	-0.1229***	0.014
University 6	-0.1351***	-0.012
University 7	-0.012	0.007
University 8	-0.1261***	0.016
Subject Area fixed effects		
Agriculture and Other Applied Biological Sciences	0.004	0.024
Anthropology and Archaeology	-0.1166***	0.028
Architecture, Design, Planning, Surveying	0.0701***	0.014
Biomedical	0.0625**	0.021
Chemistry	-0.1744***	0.038
Clinical Medicine	0.0989***	0.012
Communications, Journalism and Media Studies	-0.010	0.032
Computer Science, Information Technology, Information Sciences	-0.0908***	0.021
Dentistry	0.0944***	0.013
Design	0.0524**	0.018
Earth Sciences	-0.006	0.026
Ecology, Evolution and Behaviour	-0.037	0.035
Economics	-0.0480***	0.015
Education	0.0461**	0.016
Engineering and Technology	0.012	0.031

English Language and Literature	-0.0488*	0.021
Foreign Languages and Linguistics	-0.033	0.026
History, History of Art, Classics and Curatorial Studies	-0.0740***	0.019
Human Geography	-0.011	0.035
Law	0.0626***	0.014
Management, Human Resources, Industrial Relations, International Business and Other Business	-0.037	0.021
Marketing and Tourism	0.010	0.014
Molecular, Cellular and Whole Organism Biology	-0.045	0.034
Music, Literary Arts and Other Arts	0.010	0.028
Māori Knowledge and Development	-0.042	0.048
Other Health Studies (including Rehabilitation Therapies)	0.0801***	0.015
Philosophy	-0.1249***	0.024
Physics	-0.025	0.028
Political Science, International Relations and Public Policy	-0.0672**	0.024
Psychology	-0.0475*	0.024
Public Health	0.021	0.035
Pure and Applied Mathematics	-0.2048***	0.029
Religious Studies and Theology	-0.055	0.039
Sociology, Social Policy, Social Work, Criminology and Gender Studies	-0.0716***	0.022
Sport and Exercise Science	0.012	0.032
Statistics	-0.2208***	0.045
Theatre and Dance, Film and Television and Multimedia	-0.052	0.055
Veterinary Studies and Large Animal Science	0.0605**	0.022
Visual Arts and Crafts	0.0651**	0.021
Year fixed effects		
First year at the tertiary education institute of the student – 1999	0.0244***	0.008
First year at the tertiary education institute of the student – 2007	0.0467**	0.015
First year at the tertiary education institute of the student – 2008	0.0453**	0.015

Notes: (1) The dependent variable is the *pass rate* of the student. (2) The omitted category variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (3) The omitted category variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. I have estimated all the coefficients by using university, subject area, and year fixed effects. (4) I am not allowed to identify specific universities due to the 5.14.2 confidentiality entity clause set by Stats NZ. (5) Significance levels are indicated by: * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$.

Table 2.D.2: Determinants of Student Pass Rates; Alternative Model Specifications and Estimators: Likelihood of passing 80% of courses (Probit Model)

	dy/dx	Standard Error
PBRF Outcomes		
Proportion of academics attaining PBRF rank A	0.0001274	0.001
Proportion of academics attaining PBRF rank B	-0.0003411	0.000
Proportion of academics attaining PBRF rank C(NE)	-0.000507	0.001
Proportion of academics attaining PBRF rank R	-0.0005254	0.001
Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave	-0.0005473	0.001
Department Level Characteristics		
Researcher's Position Title		
Proportion of Professors	0.0005149	0.001
Proportion of Associate Professors	-0.0003333	0.001
Proportion of Lecturers	-0.0000601	0.000
Proportion of Other Teaching Staff	0.000262	0.001
Proportion of Other Non-Teaching Staff	-0.0001557	0.000
Researcher's Gender		
Proportion of female academics	0.0001282	0.000
Proportion of academics for whom gender is unknown	-0.0014**	0.001
Researcher's Age Band		
Proportion of academics in the age band of 20 to 29	0.0015901	0.001
Proportion of academics in the age band of 40 to 49	-0.0008*	0.000
Proportion of academics in the age band of 50 to 59	-0.0012**	0.000
Proportion of academics in the age band of 60 to 69	-0.0004598	0.000
Proportion of academics in the age band of 70 and Over	-0.0025385	0.001
Proportion of academics for whom age band is unknown	0.0005113	0.000
Researcher's Ethnicity		
Proportion of Asian academics	-0.0007027	0.001
Proportion of Māori academics	-0.0007438	0.000
Proportion of Pasifika academics	0.0002785	0.001
Proportion of Middle Eastern/Latin American/African academics	-0.0003328	0.002
Proportion of academics belonging to "other ethnicity"	-0.0001159	0.000
Proportion of academics for whom ethnicity is unknown	0.0001	0.000
Student Level Characteristics		
Student's gender		
Female student	0.0621***	0.005
Student's ethnicity		
Asian student	-0.0959***	-0.007
Māori student	-0.1008***	0.010
Pasifika student	-0.1975***	-0.012
Middle Eastern/Latin American/African student	-0.1181***	0.019
Student belonging to "other ethnicity"	-0.0499***	0.012
Student for whom ethnicity is unknown	0.0072247	0.035

Student's high school decile		
School decile 1	-0.0559***	0.017
School decile 2	-0.0324*	0.013
School decile 3	-0.0124684	0.010
School decile 4	-0.0115374	0.010
School decile 6	0.0019271	0.008
School decile 7	0.0133995	0.008
School decile 8	0.0089471	0.009
School decile 9	0.0170*	0.008
School decile 10	0.0234**	0.008
School decile missing	0.0211341	0.028
Level of NCEA achieved by the student		
Achieved less than NCEA level 3	-0.0556***	0.006
Overseas equivalent to NCEA level 3	0.0344**	0.013
Missing observations on NCEA level achieved	-0.0680***	0.018
University fixed effects		
University 2	-0.0693***	0.021
University 3	-0.0723***	0.016
University 4	-0.0298*	0.013
University 5	-0.1424***	0.018
University 6	-0.1592***	0.017
University 7	-0.0114392	0.012
University 8	-0.1574***	0.021
Subject Area fixed effects		
Agriculture and Other Applied Biological Sciences	0.0077969	0.031
Anthropology and Archaeology	-0.1621***	0.034
Architecture, Design, Planning, Surveying	0.1058***	0.020
Biomedical	0.0978***	0.028
Chemistry	-0.2022***	0.043
Clinical Medicine	0.1466***	0.016
Communications, Journalism and Media Studies	0.0010145	0.039
Computer Science, Information Technology, Information Sciences	-0.1200***	0.027
Dentistry	0.1343***	0.017
Design	0.0819***	0.024
Earth Sciences	-0.0184812	0.038
Ecology, Evolution and Behaviour	-0.0278037	0.043
Economics	-0.0507**	0.018
Education	0.0661**	0.021
Engineering and Technology	0.0058251	0.041
English Language and Literature	-0.0572*	0.026
Foreign Languages and Linguistics	-0.0287671	0.028
History, History of Art, Classics and Curatorial Studies	-0.0816***	0.023
Human Geography	0.0114369	0.035
Law	0.1006***	0.019

Management, Human Resources, Industrial Relations, International Business and Other Business	-0.0402119	0.026
Marketing and Tourism	0.0169789	0.018
Molecular, Cellular and Whole Organism Biology	-0.0570442	0.040
Music, Literary Arts and Other Arts	0.0170142	0.039
Māori Knowledge and Development	-0.030566	0.058
Other Health Studies (including Rehabilitation Therapies)	0.1187***	0.021
Philosophy	-0.1526***	0.030
Physics	-0.0567002	0.038
Political Science, International Relations and Public Policy	-0.0535348	0.029
Psychology	-0.0490977	0.030
Public Health	0.0346289	0.045
Pure and Applied Mathematics	-0.1911***	0.031
Religious Studies and Theology	-0.0921*	0.043
Sociology, Social Policy, Social Work, Criminology and Gender Studies	-0.0745**	0.028
Sport and Exercise Science	0.0280501	0.031
Statistics	-0.2481***	0.051
Theatre and Dance, Film and Television and Multimedia	-0.024503	0.051
Veterinary Studies and Large Animal Science	0.1132***	0.024
Visual Arts and Crafts	0.1020***	0.025
Year fixed effects		
First year at the tertiary education institute of the student – 1999	0.0205*	0.009
First year at the tertiary education institute of the student – 2007	0.0531**	0.020
First year at the tertiary education institute of the student – 2008	0.0476*	0.020

Notes: (1) The dependent variable is the *pass rate* of the student. (2) The omitted category variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (3) The omitted category variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. I have estimated all the coefficients by using university, subject area, and year fixed effects. (4) I am not allowed to identify specific universities due to the 5.14.2 confidentiality entity clause set by Stats NZ. (5) Significance levels are indicated by: * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$.

Table 2.D.3: Determinants of Student Pass Rates; Alternative Model Specifications and Estimators: Likelihood of passing 90% of courses (Probit Model)

	dy/dx	Standard Error
PBRF Outcomes		
Proportion of academics attaining PBRF rank A	-0.0006	0.001
Proportion of academics attaining PBRF rank B	-0.0004	0.001
Proportion of academics attaining PBRF rank C(NE)	-0.0003	0.001
Proportion of academics attaining PBRF rank R	-0.0002	0.001
Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave	-0.0005	0.001
Department Level Characteristics		
Researcher's Position Title		
Proportion of Professors	0.0015	0.001
Proportion of Associate Professors	0.0000	0.001
Proportion of Lecturers	-0.0005	0.001
Proportion of Other Teaching Staff	0.0018	0.001
Proportion of Other Non-Teaching Staff	0.0008	0.001
Researcher's Gender		
Proportion of female academics	0.0000	0.000
Proportion of academics for whom gender is unknown	-0.0011	0.001
Researcher's Age Band		
Proportion of academics in the age band of 20 to 29	0.0012	0.002
Proportion of academics in the age band of 40 to 49	-0.0009	0.001
Proportion of academics in the age band of 50 to 59	-0.0013*	0.001
Proportion of academics in the age band of 60 to 69	0.0005	0.001
Proportion of academics in the age band of 70 and Over	-0.0037	0.002
Proportion of academics for whom age band is unknown	-0.0000	0.001
Researcher's Ethnicity		
Proportion of Asian academics	-0.0010	0.001
Proportion of Māori academics	-0.0006	0.001
Proportion of Pasifika academics	0.0006	0.002
Proportion of Middle Eastern/Latin American/African academics	-0.0010	0.003
Proportion of academics belonging to "other ethnicity"	-0.0006	0.000
Proportion of academics for whom ethnicity is unknown	-0.0001	0.000
Student Level Characteristics		
Student's gender		
Female student	0.0966***	0.007
Student's ethnicity		
Asian student	-0.1467***	-0.010
Māori student	-0.1615***	-0.015
Pasifika student	-0.3311***	-0.019
Middle Eastern/Latin American/African student	-0.1969***	0.026
Student belonging to "other ethnicity"	-0.1271***	0.017
Student for whom ethnicity is unknown	-0.0847	0.046

Student's high school decile		
School decile 1	-0.0825***	0.023
School decile 2	-0.0276	0.021
School decile 3	-0.0110	0.015
School decile 4	-0.0025	0.015
School decile 6	0.0233	0.013
School decile 7	0.0221	0.013
School decile 8	0.0211	0.012
School decile 9	0.0234*	0.012
School decile 10	0.0375**	0.012
School decile missing	0.0165	0.034
Level of NCEA achieved by the student		
Achieved less than NCEA level 3	-0.0750***	0.010
Overseas equivalent to NCEA level 3	0.0434**	0.015
Missing observations on NCEA level achieved	-0.0876**	0.026
University fixed effects		
University 2	-0.1278***	0.034
University 3	-0.0926**	0.028
University 4	-0.0331	0.025
University 5	-0.1837***	0.029
University 6	-0.1804***	0.028
University 7	-0.0243***	0.024
University 8	-0.1679***	0.033
Subject Area fixed effects		
Agriculture and Other Applied Biological Sciences	-0.0010	0.040
Anthropology and Archaeology	-0.1435**	0.047
Architecture, Design, Planning, Surveying	0.1872***	0.027
Biomedical	0.0640	0.059
Chemistry	-0.2377***	0.050
Clinical Medicine	0.2772***	0.023
Communications, Journalism and Media Studies	0.0471	0.047
Computer Science, Information Technology, Information Sciences	-0.1539***	0.031
Dentistry	0.2179***	0.025
Design	0.1617***	0.038
Earth Sciences	-0.0399	0.052
Ecology, Evolution and Behaviour	-0.0445	0.052
Economics	-0.0262	0.025
Education	0.1088**	0.032
Engineering and Technology	0.0192	0.047
English Language and Literature	-0.0771*	0.033
Foreign Languages and Linguistics	-0.0019	0.032
History, History of Art, Classics and Curatorial Studies	-0.0631*	0.027
Human Geography	-0.0077	0.051
Law	0.1662***	0.030

Management, Human Resources, Industrial Relations, International Business and Other Business	-0.0557	0.037
Marketing and Tourism	0.0038	0.029
Molecular, Cellular and Whole Organism Biology	-0.0964*	0.044
Music, Literary Arts and Other Arts	0.0327	0.055
Māori Knowledge and Development	-0.0715	0.087
Other Health Studies (including Rehabilitation Therapies)	0.1831***	0.033
Philosophy	-0.1757***	0.042
Physics	-0.0617	0.046
Political Science, International Relations and Public Policy	-0.0232	0.035
Psychology	-0.0378	0.039
Public Health	-0.1155	0.086
Pure and Applied Mathematics	-0.1811***	0.044
Religious Studies and Theology	-0.1393*	0.064
Sociology, Social Policy, Social Work, Criminology and Gender Studies	-0.0730*	0.035
Sport and Exercise Science	0.0652	0.044
Statistics	-0.2560***	0.049
Theatre and Dance, Film and Television and Multimedia	0.0176	0.052
Veterinary Studies and Large Animal Science	0.1900***	0.031
Visual Arts and Crafts	0.1906***	0.032
Year fixed effects		
First year at the tertiary education institute of the student – 1999	0.0249*	0.012
First year at the tertiary education institute of the student – 2007	0.0424	0.029
First year at the tertiary education institute of the student – 2008	0.0329	0.029

Notes: (1) The dependent variable is the *pass rate* of the student. (2) The omitted category variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (3) The omitted category variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. I have estimated all the coefficients by using university, subject area, and year fixed effects. (4) I am not allowed to identify specific universities due to the 5.14.2 confidentiality entity clause set by Stats NZ. (5) Significance levels are indicated by: * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$.

Table 2.D.4: Determinants of Student Pass Rates; Alternative Model Specifications and Estimators: Likelihood of passing 95% of courses (Probit Model)

	dy/dx	Standard Error
PBRF Outcomes		
Proportion of academics attaining PBRF rank A	-0.0013883	0.0011
Proportion of academics attaining PBRF rank B	-0.0007275	0.0007
Proportion of academics attaining PBRF rank C(NE)	-0.0001767	0.0009
Proportion of academics attaining PBRF rank R	0.0003522	0.0011
Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave	-0.0003622	0.0010
Department Level Characteristics		
Researcher's Position Title		
Proportion of Professors	0.0024*	0.0010
Proportion of Associate Professors	0.0002081	0.0010
Proportion of Lecturers	-0.0007397	0.0007
Proportion of Other Teaching Staff	0.0019902	0.0015
Proportion of Other Non-Teaching Staff	0.0007442	0.0008
Researcher's Gender		
Proportion of female academics	-0.0001063	0.0005
Proportion of academics for whom gender is unknown	-0.0007258	0.0010
Researcher's Age Band		
Proportion of academics in the age band of 20 to 29	0.0004825	0.0021
Proportion of academics in the age band of 40 to 49	-0.0008961	0.0006
Proportion of academics in the age band of 50 to 59	-0.0016*	0.0008
Proportion of academics in the age band of 60 to 69	0.0007333	0.0008
Proportion of academics in the age band of 70 and Over	-0.0042092	0.0028
Proportion of academics for whom age band is unknown	-0.0003143	0.0009
Researcher's Ethnicity		
Proportion of Asian academics	-0.0017991	0.0009
Proportion of Māori academics	-0.0002416	0.0010
Proportion of Pasifika academics	0.000307	0.0019
Proportion of Middle Eastern/Latin American/African academics	-0.0012098	0.0029
Proportion of academics belonging to "other ethnicity"	-0.0003176	0.0006
Proportion of academics for whom ethnicity is unknown	-0.0001579	0.0006
Student Level Characteristics		
Student's gender		
Female student	0.1063***	0.0073
Student's ethnicity		
Asian student	-0.1638***	-0.0128
Māori student	-0.1891***	-0.0157
Pasifika student	-0.3725***	-0.0222
Middle Eastern/Latin American/African student	-0.2297***	0.0239
Student belonging to "other ethnicity"	-0.1389***	0.0199
Student for whom ethnicity is unknown	-0.0941*	0.0453

Student's high school decile		
School decile 1	-0.0826***	0.0244
School decile 2	-0.0199082	0.0220
School decile 3	-0.0147317	0.0152
School decile 4	0.0061148	0.0155
School decile 6	0.0221046	0.0142
School decile 7	0.0124655	0.0133
School decile 8	0.0245756	0.0132
School decile 9	0.0181092	0.0124
School decile 10	0.0456***	0.0124
School decile missing	0.0294981	0.0343
Level of NCEA achieved by the student		
Achieved less than NCEA level 3	-0.0754***	0.0116
Overseas equivalent to NCEA level 3	0.0394*	0.0173
Missing observations on NCEA level achieved	-0.078**	0.0282
University fixed effects		
University 2	-0.1404***	0.0397
University 3	-0.1153***	0.0357
University 4	-0.0348005	0.0340
University 5	-0.1929***	0.0354
University 6	-0.1767***	0.0339
University 7	-0.0703*	0.0326
University 8	-0.1680***	0.0404
Subject Area fixed effects		
Agriculture and Other Applied Biological Sciences	0.0284307	0.0450
Anthropology and Archaeology	-0.0889769	0.0479
Architecture, Design, Planning, Surveying	0.2170***	0.0318
Biomedical	0.0764254	0.0841
Chemistry	-0.156**	0.0563
Clinical Medicine	0.4076***	0.0267
Communications, Journalism and Media Studies	0.0954745	0.0563
Computer Science, Information Technology, Information Sciences	-0.1226***	0.0350
Dentistry	0.3025***	0.0286
Design	0.2378***	0.0478
Earth Sciences	-0.0339849	0.0561
Ecology, Evolution and Behaviour	-0.0250629	0.0543
Economics	-0.0086151	0.0283
Education	0.1389***	0.0380
Engineering and Technology	0.0656077	0.0484
English Language and Literature	-0.0691802	0.0377
Foreign Languages and Linguistics	0.0375648	0.0445
History, History of Art, Classics and Curatorial Studies	-0.0526867	0.0331
Human Geography	-0.030809	0.0482
Law	0.1951***	0.0367

Management, Human Resources, Industrial Relations, International Business and Other Business	-0.0518885	0.0396
Marketing and Tourism	-0.0022894	0.0309
Molecular, Cellular and Whole Organism Biology	-0.0364014	0.0462
Music, Literary Arts and Other Arts	0.0624458	0.0655
Māori Knowledge and Development	-0.0483187	0.0901
Other Health Studies (including Rehabilitation Therapies)	0.2410***	0.0437
Philosophy	-0.1749***	0.0424
Physics	-0.0497016	0.0554
Political Science, International Relations and Public Policy	-0.0027398	0.0395
Psychology	-0.0065539	0.0427
Public Health	-0.0748693	0.0938
Pure and Applied Mathematics	-0.1233*	0.0507
Religious Studies and Theology	-0.1424*	0.0600
Sociology, Social Policy, Social Work, Criminology and Gender Studies	-0.0438423	0.0381
Sport and Exercise Science	0.0335752	0.0425
Statistics	-0.2180***	0.0494
Theatre and Dance, Film and Television and Multimedia	0.0918534	0.0559
Veterinary Studies and Large Animal Science	0.2950***	0.0358
Visual Arts and Crafts	0.2430***	0.0444
Year fixed effects		
First year at the tertiary education institute of the student – 1999	0.0339*	0.0141
First year at the tertiary education institute of the student – 2007	0.0484419	0.0354
First year at the tertiary education institute of the student – 2008	0.0430173	0.0357

Notes: (1) The dependent variable is the *pass rate* of the student. (2) The omitted category variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (3) The omitted category variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. I have estimated all the coefficients by using university, subject area, and year fixed effects. (4) I am not allowed to identify specific universities due to the 5.14.2 confidentiality entity clause set by Stats NZ. (5) Significance levels are indicated by: * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$.

Appendix 2E: Determinants of Student Pass Rates; Subsample Analysis – Tobit Estimation for Students' Gender, Decile and Subject Groups

Table 2.E.1: Determinants of Student Pass Rates; Subsample Analysis (Student's Gender – Male)

	Coefficient	Robust S.E.
PBRF Outcomes		
Proportion of academics attaining PBRF rank A	-0.022	0.075
Proportion of academics attaining PBRF rank B	-0.027	0.045
Proportion of academics attaining PBRF rank C(NE)	-0.045	0.069
Proportion of academics attaining PBRF rank R	0.057	0.070
Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave	-0.006	0.071
Department Level Characteristics		
Researcher's Position Title		
Proportion of Professors	0.065	0.072
Proportion of Associate Professors	-0.034	0.071
Proportion of Lecturers	-0.015	0.049
Proportion of Other Teaching Staff	0.050	0.096
Proportion of Other Non-Teaching Staff	0.060	0.063
Researcher's Gender		
Proportion of female academics	0.015	0.038
Proportion of academics for whom gender is unknown	-0.032	0.081
Researcher's Age Band		
Proportion of academics in the age band of 20 to 29	0.059	0.155
Proportion of academics in the age band of 40 to 49	-0.037	0.046
Proportion of academics in the age band of 50 to 59	-0.082	0.052
Proportion of academics in the age band of 60 to 69	-0.018	0.057
Proportion of academics in the age band of 70 and Over	-0.187	0.160
Proportion of academics for whom age band is unknown	0.029	0.070
Researcher's Ethnicity		
Proportion of Asian academics	-0.034	0.061
Proportion of Māori academics	-0.067	0.059
Proportion of Pasifika academics	-0.014	0.134
Proportion of Middle Eastern/Latin American/African academics	-0.063	0.271
Proportion of academics belonging to "other ethnicity"	-0.024	0.047
Proportion of academics for whom ethnicity is unknown	0.001	0.044
Student Level Characteristics		
Student's ethnicity		
Asian student	-9.218***	0.924
Māori student	-11.970***	1.315
Pasifika student	-20.503***	1.570
Middle Eastern/Latin American/African student	-14.049***	1.893

Student belonging to “other ethnicity”	-7.809***	1.387
Student for whom ethnicity is unknown	-2.325	3.085
Student’s high school decile		
School decile 1	-3.857	2.004
School decile 2	-4.510*	1.774
School decile 3	0.514	1.307
School decile 4	-0.131	1.193
School decile 6	1.306	1.175
School decile 7	1.426	1.061
School decile 8	2.450*	1.053
School decile 9	1.923	1.061
School decile 10	2.811**	1.062
School decile missing	-2.599	3.914
Level of NCEA achieved by the student		
Achieved less than NCEA level 3	-6.997***	0.788
Overseas equivalent to NCEA level 3	2.777**	0.906
Missing observations on NCEA level achieved	-8.320***	2.418
University fixed effects		
University 2	-10.491**	3.361
University 3	-9.235**	2.916
University 4	-3.585	2.899
University 5	-16.500***	3.138
University 6	-18.004***	2.986
University 7	-2.568	2.803
University 8	-16.985***	3.226
Subject Area fixed effects		
Agriculture and Other Applied Biological Sciences	2.961	2.999
Anthropology and Archaeology	-15.981***	3.972
Architecture, Design, Planning, Surveying	14.440***	2.578
Biomedical	4.417	5.955
Chemistry	-7.235*	3.322
Clinical Medicine	38.837***	3.719
Communications, Journalism and Media Studies	-0.672	3.607
Computer Science, Information Technology, Information Sciences	-7.879***	2.017
Dentistry	23.513***	2.674
Design	16.324***	4.513
Earth Sciences	-0.470	3.775
Ecology, Evolution and Behaviour	-3.291	3.820
Economics	-2.146	1.853
Education	5.816*	2.783
Engineering and Technology	2.446	3.351
English Language and Literature	-3.150	2.946
Foreign Languages and Linguistics	-2.075	2.740
History, History of Art, Classics and Curatorial Studies	-6.553*	2.802

Human Geography	0.111	4.260
Law	11.097***	2.524
Management, Human Resources, Industrial Relations, International Business and Other Business	-4.865	2.636
Marketing and Tourism	0.054	1.793
Molecular, Cellular and Whole Organism Biology	-0.498	3.267
Music, Literary Arts and Other Arts	4.574	4.380
Māori Knowledge and Development	2.295	5.715
Other Health Studies (including Rehabilitation Therapies)	13.943***	3.961
Philosophy	-10.916***	2.724
Physics	-1.909	3.494
Political Science, International Relations and Public Policy	-4.279	2.957
Psychology	-5.319	3.250
Public Health	-2.948	5.486
Pure and Applied Mathematics	-10.946***	2.668
Religious Studies and Theology	-8.011	6.175
Sociology, Social Policy, Social Work, Criminology and Gender Studies	-7.122*	3.284
Sport and Exercise Science	0.036	3.516
Statistics	-13.801***	2.821
Theatre and Dance, Film and Television and Multimedia	-4.097	4.851
Veterinary Studies and Large Animal Science	8.754	7.930
Visual Arts and Crafts	16.669***	4.023
Year fixed effects		
First year at the tertiary education institute of the student – 1999	1.728	1.357
First year at the tertiary education institute of the student – 2007	5.247*	2.574
First year at the tertiary education institute of the student – 2008	4.734	2.581
constant	108.731***	5.812
Number of observations	16,125	

Notes: (1) The dependent variable is the *pass rate* of the student. (2) The robust standard errors which are clustered on the *id* (*id* is composed of evaluation year, university, and subject area) level. Standard errors are adjusted for 498 clusters in *id*. (3) The omitted category variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (4) The omitted category variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. I have estimated all the coefficients by using university, subject area, and year fixed effects. (5) I am not allowed to identify specific universities due to the 5.14.2 confidentiality entity clause set by Stats NZ. (6) Significance levels are indicated by: * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$.

Table 2.E.2: Determinants of Student Pass Rates; Subsample Analysis (Student's Gender – Female)

	Coefficient	Robust Standard Error
PBRF Outcomes		
Proportion of academics attaining PBRF rank A	0.010	0.078
Proportion of academics attaining PBRF rank B	-0.009	0.049
Proportion of academics attaining PBRF rank C(NE)	-0.019	0.067
Proportion of academics attaining PBRF rank R	-0.009	0.067
Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave	-0.014	0.057
Department Level Characteristics		
Researcher's Position Title		
Proportion of Professors	0.075	0.071
Proportion of Associate Professors	-0.032	0.065
Proportion of Lecturers	-0.022	0.048
Proportion of Other Teaching Staff	0.037	0.109
Proportion of Other Non-Teaching Staff	0.016	0.053
Researcher's Gender		
Proportion of female academics	-0.001	0.033
Proportion of academics for whom gender is unknown	-0.004	0.068
Researcher's Age Band		
Proportion of academics in the age band of 20 to 29	0.006	0.155
Proportion of academics in the age band of 40 to 49	-0.070	0.044
Proportion of academics in the age band of 50 to 59	-0.141*	0.057
Proportion of academics in the age band of 60 to 69	0.024	0.060
Proportion of academics in the age band of 70 and Over	-0.260	0.189
Proportion of academics for whom age band is unknown	-0.045	0.068
Researcher's Ethnicity		
Proportion of Asian academics	-0.172**	0.064
Proportion of Māori academics	-0.033	0.062
Proportion of Pasifika academics	0.101	0.143
Proportion of Middle Eastern/Latin American/African academics	-0.104	0.180
Proportion of academics belonging to "other ethnicity"	0.001	0.045
Proportion of academics for whom ethnicity is unknown	-0.017	0.039
Student Level Characteristics		
Student's ethnicity		
Asian student	-9.290***	0.924
Māori student	-13.416***	1.035
Pasifika student	-24.398***	1.402
Middle Eastern/Latin American/African student	-11.477***	1.984
Student belonging to "other ethnicity"	-6.513***	1.269
Student for whom ethnicity is unknown	-6.976*	2.792

Student's high school decile		
School decile 1	-6.596***	1.699
School decile 2	-2.341	1.329
School decile 3	-1.124	0.954
School decile 4	-1.086	0.974
School decile 6	0.214	0.923
School decile 7	0.557	0.925
School decile 8	1.544	0.821
School decile 9	1.252	0.839
School decile 10	2.751**	0.882
School decile missing	4.415	2.504
Level of NCEA achieved by the student		
Achieved less than NCEA level 3	-5.329***	0.832
Overseas equivalent to NCEA level 3	1.043	1.367
Missing observations on NCEA level achieved	-8.438***	2.180
University fixed effects		
University 2	-12.818***	2.847
University 3	-10.091***	2.512
University 4	-7.173**	2.444
University 5	-17.886***	2.387
University 6	-16.489***	2.377
University 7	-6.137**	2.272
University 8	-15.119***	2.932
Subject Area fixed effects		
Agriculture and Other Applied Biological Sciences	0.159	3.114
Anthropology and Archaeology	-7.608**	2.846
Architecture, Design, Planning, Surveying	13.168***	2.765
Biomedical	3.160	4.548
Chemistry	-14.089***	4.263
Clinical Medicine	34.712***	5.275
Communications, Journalism and Media Studies	1.600	3.500
Computer Science, Information Technology, Information Sciences	-9.277**	3.371
Dentistry	20.748***	2.756
Design	20.624***	4.192
Earth Sciences	-3.283	2.779
Ecology, Evolution and Behaviour	-2.748	3.518
Economics	-2.101	2.046
Education	6.573*	2.570
Engineering and Technology	8.524*	4.217
English Language and Literature	-4.944	2.595
Foreign Languages and Linguistics	0.289	3.092
History, History of Art, Classics and Curatorial Studies	-5.739**	2.114
Human Geography	-2.243	3.960
Law	6.674*	2.640

Management, Human Resources, Industrial Relations, International Business and Other Business	-3.813	2.283
Marketing and Tourism	-0.612	1.847
Molecular, Cellular and Whole Organism Biology	-7.084	3.705
Music, Literary Arts and Other Arts	1.379	3.801
Māori Knowledge and Development	-6.008	5.797
Other Health Studies (including Rehabilitation Therapies)	10.386***	2.816
Philosophy	-12.686***	3.278
Physics	-6.581	4.080
Political Science, International Relations and Public Policy	-1.930	3.014
Psychology	-2.237	2.753
Public Health	-3.665	4.883
Pure and Applied Mathematics	-15.683***	3.837
Religious Studies and Theology	-10.679***	3.226
Sociology, Social Policy, Social Work, Criminology and Gender Studies	-7.378**	2.650
Sport and Exercise Science	0.016	2.521
Statistics	-16.336***	2.466
Theatre and Dance, Film and Television and Multimedia	3.693	4.243
Veterinary Studies and Large Animal Science	10.151**	3.383
Visual Arts and Crafts	13.918***	3.928
Year fixed effects		
First year at the tertiary education institute of the student – 1999	1.647	1.179
First year at the tertiary education institute of the student – 2007	0.277	2.654
First year at the tertiary education institute of the student – 2008	0.459	2.640
constant	124.281***	5.782
Number of observations	21,255	

Notes: (1) The dependent variable is the *pass rate* of the student. (2) The robust standard errors which are clustered on the *id* (*id* is composed of evaluation year, university, and subject area) level. Standard errors are adjusted for 502 clusters in *id*. (3) The omitted category variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (4) The omitted category variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. I have estimated all the coefficients by using university, subject area, and year fixed effects. (5) I am not allowed to identify specific universities due to the 5.14.2 confidentiality entity clause set by Stats NZ. (6) Significance levels are indicated by: * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$.

Table 2.E.3: Determinants of Student Pass Rates; Subsample Analysis (Student's High School Decile 1, 2 and 3)

	Coefficient	Robust S.E.
PBRF Outcomes		
Proportion of academics attaining PBRF rank A	0.091	0.118
Proportion of academics attaining PBRF rank B	0.026	0.072
Proportion of academics attaining PBRF rank C(NE)	0.040	0.114
Proportion of academics attaining PBRF rank R	0.034	0.085
Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave	-0.047	0.083
Department Level Characteristics		
Researcher's Position Title		
Proportion of Professors	-0.048	0.101
Proportion of Associate Professors	-0.090	0.107
Proportion of Lecturers	0.031	0.068
Proportion of Other Teaching Staff	0.099	0.140
Proportion of Other Non-Teaching Staff	0.102	0.082
Researcher's Gender		
Proportion of female academics	-0.037	0.053
Proportion of academics for whom gender is unknown	-0.095	0.118
Researcher's Age Band		
Proportion of academics in the age band of 20 to 29	-0.025	0.255
Proportion of academics in the age band of 40 to 49	-0.026	0.069
Proportion of academics in the age band of 50 to 59	0.037	0.079
Proportion of academics in the age band of 60 to 69	0.092	0.091
Proportion of academics in the age band of 70 and Over	0.148	0.222
Proportion of academics for whom age band is unknown	0.074	0.113
Researcher's Ethnicity		
Proportion of Asian academics	-0.203*	0.099
Proportion of Māori academics	-0.015	0.071
Proportion of Pasifika academics	-0.154	0.259
Proportion of Middle Eastern/Latin American/African academics	0.310	0.408
Proportion of academics belonging to "other ethnicity"	-0.103	0.093
Proportion of academics for whom ethnicity is unknown	-0.059	0.067
Student Level Characteristics		
Student's gender		
Female student	4.877***	1.089
Student's ethnicity		
Asian student	-10.743***	1.477
Māori student	-14.521***	1.591
Pasifika student	-25.594***	1.530
Middle Eastern/Latin American/African student	-19.827***	4.624
Student belonging to "other ethnicity"	-9.926***	2.405
Student for whom ethnicity is unknown	-18.540**	6.159
Level of NCEA achieved by the student		
Achieved less than NCEA level 3	-5.004***	1.228
Overseas equivalent to NCEA level 3	-2.749	4.068
Missing observations on NCEA level achieved	-5.218	3.945

University fixed effects		
University 2	-6.521	5.969
University 3	-10.902***	3.281
University 4	-3.276	3.347
University 5	-21.075***	4.178
University 6	-19.854***	3.295
University 7	-3.985	2.592
University 8	-19.312***	3.835
Subject Area fixed effects		
Agriculture and Other Applied Biological Sciences	-2.429	6.329
Anthropology and Archaeology	-19.827***	5.075
Architecture, Design, Planning, Surveying	10.699*	5.034
Biomedical	-5.870	8.136
Chemistry	-19.609***	5.156
Clinical Medicine	23.094***	7.140
Communications, Journalism and Media Studies	-3.010	4.895
Computer Science, Information Technology, Information Sciences	-13.535***	3.537
Dentistry	15.561*	6.594
Design	26.152***	5.556
Earth Sciences	-9.395	5.214
Ecology, Evolution and Behaviour	-2.426	5.956
Economics	-9.494*	4.396
Education	3.931	3.982
Engineering and Technology	-0.109	5.742
English Language and Literature	-10.399*	4.651
Foreign Languages and Linguistics	-8.311*	3.845
History, History of Art, Classics and Curatorial Studies	-14.130***	4.419
Human Geography	-19.286*	9.144
Law	0.476	4.222
Management, Human Resources, Industrial Relations, International Business and Other Business	-7.912*	3.868
Marketing and Tourism	2.250	3.191
Molecular, Cellular and Whole Organism Biology	-16.260***	5.074
Music, Literary Arts and Other Arts	-8.252	7.079
Māori Knowledge and Development	-11.148	7.658
Other Health Studies (including Rehabilitation Therapies)	6.215	4.508
Philosophy	-19.927***	6.119
Physics	-21.911***	5.068
Political Science, International Relations and Public Policy	-13.818**	4.920
Psychology	-10.196*	4.514
Public Health	-2.951	7.022
Pure and Applied Mathematics	-21.059***	5.015
Religious Studies and Theology	-8.639	9.217
Sociology, Social Policy, Social Work, Criminology and Gender Studies	-10.732*	4.272
Sport and Exercise Science	-7.483	4.475
Statistics	-17.525***	5.400
Theatre and Dance, Film and Television and Multimedia	-1.213	9.897
Veterinary Studies and Large Animal Science	3.237	11.348
Visual Arts and Crafts	20.897*	8.200

Year fixed effects		
First year at the tertiary education institute of the student – 1999	4.712*	2.334
First year at the tertiary education institute of the student – 2007	2.342	4.040
First year at the tertiary education institute of the student – 2008	1.651	4.061
constant	112.800***	8.801
Number of observations	4,197	

Notes: (1) The dependent variable is the *pass rate* of the student. (2) The robust standard errors which are clustered on the *id* (*id* is composed of evaluation year, university, and subject area) level. Standard errors are adjusted for 414 clusters in *id*. (3) The omitted category variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (4) The omitted category variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. I have estimated all the coefficients by using university, subject area, and year fixed effects. (5) I am not allowed to identify specific universities due to the 5.14.2 confidentiality entity clause set by Stats NZ. (6) Significance levels are indicated by: * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$.

Table 2.E.4: Determinants of Student Pass Rates; Subsample Analysis (Student's High School Decile 4, 5 and 6)

	Coefficient	Robust Standard Error
PBRF Outcomes		
Proportion of academics attaining PBRF rank A	-0.051	0.084
Proportion of academics attaining PBRF rank B	-0.047	0.052
Proportion of academics attaining PBRF rank C(NE)	0.002	0.076
Proportion of academics attaining PBRF rank R	-0.002	0.075
Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave	0.002	0.059
Department Level Characteristics		
Researcher's Position Title		
Proportion of Professors	0.075	0.072
Proportion of Associate Professors	0.045	0.072
Proportion of Lecturers	-0.030	0.052
Proportion of Other Teaching Staff	0.026	0.112
Proportion of Other Non-Teaching Staff	0.082	0.059
Researcher's Gender		
Proportion of female academics	0.039	0.036
Proportion of academics for whom gender is unknown	-0.007	0.072
Researcher's Age Band		
Proportion of academics in the age band of 20 to 29	0.042	0.169
Proportion of academics in the age band of 40 to 49	-0.004	0.049
Proportion of academics in the age band of 50 to 59	-0.073	0.055
Proportion of academics in the age band of 60 to 69	0.040	0.063
Proportion of academics in the age band of 70 and Over	-0.097	0.199
Proportion of academics for whom age band is unknown	-0.008	0.073
Researcher's Ethnicity		
Proportion of Asian academics	-0.094	0.067
Proportion of Māori academics	-0.050	0.054
Proportion of Pasifika academics	-0.072	0.161
Proportion of Middle Eastern/Latin American/African academics	0.050	0.242
Proportion of academics belonging to "other ethnicity"	-0.038	0.049
Proportion of academics for whom ethnicity is unknown	0.012	0.046
Student Level Characteristics		
Student's gender		
Female student	6.799***	0.740
Student's ethnicity		
Asian student	-10.599***	1.176
Māori student	-12.292***	1.393
Pasifika student	-24.275***	1.709
Middle Eastern/Latin American/African student	-19.484***	2.950
Student belonging to "other ethnicity"	-9.923***	1.986
Student for whom ethnicity is unknown	-6.940	4.419

Level of NCEA achieved by the student		
Achieved less than NCEA level 3	-8.286***	1.004
Overseas equivalent to NCEA level 3	-6.044	3.504
Missing observations on NCEA level achieved	-10.837***	2.822
University fixed effects		
University 2	-10.798**	3.442
University 3	-10.684***	3.008
University 4	-3.055	2.434
University 5	-18.043***	2.517
University 6	-18.525***	2.594
University 7	-5.610*	2.239
University 8	-16.622***	3.195
Subject Area fixed effects		
Agriculture and Other Applied Biological Sciences	0.305	3.466
Anthropology and Archaeology	-7.931	4.100
Architecture, Design, Planning, Surveying	12.865***	3.569
Biomedical	-3.064	5.074
Chemistry	-10.727**	3.743
Clinical Medicine	35.083***	4.701
Communications, Journalism and Media Studies	4.439	4.349
Computer Science, Information Technology, Information Sciences	-7.132**	2.707
Dentistry	20.408***	3.418
Design	23.144***	5.078
Earth Sciences	-3.092	2.954
Ecology, Evolution and Behaviour	-6.275	4.982
Economics	-3.204	2.704
Education	7.018**	2.710
Engineering and Technology	5.482	3.209
English Language and Literature	-4.222	2.486
Foreign Languages and Linguistics	-0.754	2.917
History, History of Art, Classics and Curatorial Studies	-8.597***	2.423
Human Geography	-1.008	4.444
Law	7.156*	3.321
Management, Human Resources, Industrial Relations, International Business and Other Business	-3.359	2.237
Marketing and Tourism	0.206	2.147
Molecular, Cellular and Whole Organism Biology	-10.360**	3.660
Music, Literary Arts and Other Arts	3.936	4.704
Māori Knowledge and Development	-4.222	5.621
Other Health Studies (including Rehabilitation Therapies)	9.510**	3.494
Philosophy	-15.020***	3.047
Physics	-6.590	3.551
Political Science, International Relations and Public Policy	-5.917	3.226
Psychology	-4.627	2.938

Public Health	-8.744	7.175
Pure and Applied Mathematics	-13.105***	3.034
Religious Studies and Theology	-10.031*	4.863
Sociology, Social Policy, Social Work, Criminology and Gender Studies	-9.617***	2.987
Sport and Exercise Science	5.167*	2.621
Statistics	-19.240***	3.866
Theatre and Dance, Film and Television and Multimedia	4.761	4.772
Veterinary Studies and Large Animal Science	10.285	5.557
Visual Arts and Crafts	14.757**	4.664
Year fixed effects		
First year at the tertiary education institute of the student – 1999	0.852	1.559
First year at the tertiary education institute of the student – 2007	1.255	2.944
First year at the tertiary education institute of the student – 2008	1.188	2.927
constant	112.088***	6.058
Number of observations	10,371	

Notes: (1) The dependent variable is the *pass rate* of the student. (2) The robust standard errors which are clustered on the *id* (*id* is composed of evaluation year, university, and subject area) level. Standard errors are adjusted for 479 clusters in *id*. (3) The omitted category variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (4) The omitted category variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. I have estimated all the coefficients by using university, subject area, and year fixed effects. (5) I am not allowed to identify specific universities due to the 5.14.2 confidentiality entity clause set by Stats NZ. (6) Significance levels are indicated by: * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$.

Table 2.E.5: Determinants of Student Pass Rates; Subsample Analysis (Student's High School Decile 7, 8, 9 and 10)

	Coefficient	Robust S.E.
PBRF Outcomes		
Proportion of academics attaining PBRF rank A	0.000	0.072
Proportion of academics attaining PBRF rank B	-0.016	0.045
Proportion of academics attaining PBRF rank C(NE)	-0.044	0.061
Proportion of academics attaining PBRF rank R	0.069	0.063
Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave	0.023	0.072
Department Level Characteristics		
Researcher's Position Title		
Proportion of Professors	0.088	0.067
Proportion of Associate Professors	-0.043	0.063
Proportion of Lecturers	-0.028	0.045
Proportion of Other Teaching Staff	-0.016	0.099
Proportion of Other Non-Teaching Staff	-0.014	0.056
Researcher's Gender		
Proportion of female academics	0.018	0.034
Proportion of academics for whom gender is unknown	0.036	0.075
Researcher's Age Band		
Proportion of academics in the age band of 20 to 29	-0.018	0.141
Proportion of academics in the age band of 40 to 49	-0.086*	0.042
Proportion of academics in the age band of 50 to 59	-0.151**	0.054
Proportion of academics in the age band of 60 to 69	-0.028	0.058
Proportion of academics in the age band of 70 and Over	-0.332*	0.166
Proportion of academics for whom age band is unknown	-0.045	0.067
Researcher's Ethnicity		
Proportion of Asian academics	-0.097	0.053
Proportion of Māori academics	-0.068	0.076
Proportion of Pasifika academics	0.109	0.120
Proportion of Middle Eastern/Latin American/African academics	-0.204	0.214
Proportion of academics belonging to "other ethnicity"	0.002	0.038
Proportion of academics for whom ethnicity is unknown	-0.015	0.038
Student Level Characteristics		
Student's gender		
Female student	7.309***	0.574
Student's ethnicity		
Asian student	-8.934***	0.869
Māori student	-14.123***	1.426
Pasifika student	-23.742***	1.785
Middle Eastern/Latin American/African student	-9.132***	1.616
Student belonging to "other ethnicity"	-5.585***	1.301
Student for whom ethnicity is unknown	-1.909	2.480
Level of NCEA achieved by the student		
Achieved less than NCEA level 3	-5.612***	0.777
Overseas equivalent to NCEA level 3	3.553***	0.849
Missing observations on NCEA level achieved	-8.488***	2.203

University fixed effects		
University 2	-11.693***	2.957
University 3	-8.873***	2.768
University 4	-6.591*	2.666
University 5	-16.041***	2.779
University 6	-15.720***	2.733
University 7	-4.470	2.641
University 8	-14.107***	3.023
Subject Area fixed effects		
Agriculture and Other Applied Biological Sciences	3.374	2.889
Anthropology and Archaeology	-9.174*	3.729
Architecture, Design, Planning, Surveying	14.565***	2.290
Biomedical	8.028	5.886
Chemistry	-8.801*	3.537
Clinical Medicine	38.986***	3.961
Communications, Journalism and Media Studies	0.638	3.313
Computer Science, Information Technology, Information Sciences	-6.797***	1.936
Dentistry	24.179***	2.650
Design	18.403***	4.280
Earth Sciences	0.164	3.677
Ecology, Evolution and Behaviour	-0.695	3.208
Economics	-0.509	1.835
Education	5.517*	2.611
Engineering and Technology	4.254	3.269
English Language and Literature	-3.450	2.385
Foreign Languages and Linguistics	0.165	2.898
History, History of Art, Classics and Curatorial Studies	-3.743	2.014
Human Geography	2.792	2.710
Law	10.099***	2.271
Management, Human Resources, Industrial Relations, International Business and Other Business	-4.612*	2.358
Marketing and Tourism	-0.895	1.468
Molecular, Cellular and Whole Organism Biology	1.233	3.240
Music, Literary Arts and Other Arts	4.664	4.106
Māori Knowledge and Development	0.202	7.471
Other Health Studies (including Rehabilitation Therapies)	13.085***	3.173
Philosophy	-9.412***	2.718
Physics	2.454	3.762
Political Science, International Relations and Public Policy	-0.597	2.527
Psychology	-1.181	2.837
Public Health	-1.370	4.466
Pure and Applied Mathematics	-11.572***	2.975
Religious Studies and Theology	-8.833*	3.856
Sociology, Social Policy, Social Work, Criminology and Gender Studies	-5.718*	2.620
Sport and Exercise Science	-1.160	2.684
Statistics	-13.151***	2.829
Theatre and Dance, Film and Television and Multimedia	0.372	3.544
Veterinary Studies and Large Animal Science	10.134*	4.237
Visual Arts and Crafts	13.472***	3.341

Year fixed effects		
First year at the tertiary education institute of the student – 1999	1.539	1.420
First year at the tertiary education institute of the student – 2007	3.794	2.479
First year at the tertiary education institute of the student – 2008	3.681	2.484
constant	114.674***	5.359
Number of observations	22,563	

Notes: (1) The dependent variable is the *pass rate* of the student. (2) The robust standard errors which are clustered on the *id* (*id* is composed of evaluation year, university, and subject area) level. Standard errors are adjusted for 507 clusters in *id*. (3) The omitted category variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (4) The omitted category variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. I have estimated all the coefficients by using university, subject area, and year fixed effects. (5) I am not allowed to identify specific universities due to the 5.14.2 confidentiality entity clause set by Stats NZ. (6) Significance levels are indicated by: * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$.

Table 2.E.6: Determinants of Student Pass Rates; Subsample Analysis (Subject Area – Humanities)

	Coefficient	Robust S.E.
PBRF Outcomes		
Proportion of academics attaining PBRF rank A	-0.093	0.106
Proportion of academics attaining PBRF rank B	0.036	0.066
Proportion of academics attaining PBRF rank C(NE)	-0.361***	0.102
Proportion of academics attaining PBRF rank R	-0.011	0.125
Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave	0.076	0.125
Department Level Characteristics		
Researcher's Position Title		
Proportion of Professors	0.127	0.083
Proportion of Associate Professors	-0.161	0.110
Proportion of Lecturers	0.040	0.109
Proportion of Other Teaching Staff	-0.089	0.181
Proportion of Other Non-Teaching Staff	-0.318**	0.104
Researcher's Gender		
Proportion of female academics	-0.027	0.058
Proportion of academics for whom gender is unknown	0.245*	0.123
Researcher's Age Band		
Proportion of academics in the age band of 20 to 29	0.080	0.353
Proportion of academics in the age band of 40 to 49	-0.104	0.077
Proportion of academics in the age band of 50 to 59	-0.261***	0.077
Proportion of academics in the age band of 60 to 69	-0.006	0.096
Proportion of academics in the age band of 70 and Over	-0.191	0.387
Proportion of academics for whom age band is unknown	-0.246	0.138
Researcher's Ethnicity		
Proportion of Asian academics	0.409**	0.133
Proportion of Māori academics	-0.129	0.080
Proportion of Pasifika academics	0.021	0.469
Proportion of Middle Eastern/Latin American/African academics	0.104	0.649
Proportion of academics belonging to "other ethnicity"	-0.137	0.097
Proportion of academics for whom ethnicity is unknown	0.027	0.070
Student Level Characteristics		
Student's gender		
Female student	7.789***	1.201
Student's ethnicity		
Asian student	-12.543***	1.617
Māori student	-15.405***	2.365
Pasifika student	-25.978***	2.381
Middle Eastern/Latin American/African student	-9.812	6.907
Student belonging to "other ethnicity"	-5.851	3.655
Student for whom ethnicity is unknown	-3.464	5.235

Student's high school decile		
School decile 1	-6.461	4.203
School decile 2	-7.948*	3.409
School decile 3	-1.156	2.255
School decile 4	-2.898	2.405
School decile 6	-0.663	2.330
School decile 7	-0.865	2.348
School decile 8	2.009	2.128
School decile 9	-0.264	2.232
School decile 10	3.242	1.960
School decile missing	6.781	5.275
Level of NCEA achieved by the student		
Achieved less than NCEA level 3	-8.097***	1.402
Overseas equivalent to NCEA level 3	4.091	2.445
Missing observations on NCEA level achieved	-12.897***	4.032
University fixed effects		
University 2	-3.513	42.309
University 3	-2.665	6.495
University 4	-12.416**	4.378
University 5	-19.061***	4.083
University 6	-29.362***	4.160
University 7	-8.106*	3.921
University 8	-21.230***	4.165
Subject Area fixed effects		
Foreign Languages and Linguistics	-3.526	2.785
History, History of Art, Classics and Curatorial Studies	-2.016	1.944
Music, Literary Arts and Other Arts	9.012**	3.044
Māori Knowledge and Development	12.748	7.673
Philosophy	-10.912**	3.615
Religious Studies and Theology	-11.264**	3.617
Theatre and Dance, Film and Television and Multimedia	8.279*	4.065
Visual Arts and Crafts	18.276***	2.506

Year fixed effects		
First year at the tertiary education institute of the student – 1999	1.390	2.263
First year at the tertiary education institute of the student – 2007	11.578**	4.522
First year at the tertiary education institute of the student – 2008	9.815*	4.575
constant	122.420***	7.570
Number of observations	4,560	

Notes: (1) The dependent variable is the *pass rate* of the student. (2) The robust standard errors which are clustered on the *id* (*id* is composed of evaluation year, university, and subject area) level. Standard errors are adjusted for 119 clusters in *id*. (3) The omitted category variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (4) The omitted category variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. I have estimated all the coefficients by using university, subject area, and year fixed effects. (5) I am not allowed to identify specific universities due to the 5.14.2 confidentiality entity clause set by Stats NZ. (6) Significance levels are indicated by: * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$.

Table 2.E.7: Determinants of Student Pass Rates; Subsample Analysis (Subject Area – Natural Sciences)

	Coefficient	Robust S.E.
PBRF Outcomes		
Proportion of academics attaining PBRF rank A	-0.190	0.149
Proportion of academics attaining PBRF rank B	-0.014	0.105
Proportion of academics attaining PBRF rank C(NE)	-0.074	0.153
Proportion of academics attaining PBRF rank R	-0.040	0.117
Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave	0.073	0.125
Department Level Characteristics		
Researcher's Position Title		
Proportion of Professors	0.163	0.121
Proportion of Associate Professors	0.025	0.109
Proportion of Lecturers	-0.143	0.149
Proportion of Other Teaching Staff	0.596*	0.276
Proportion of Other Non-Teaching Staff	0.078	0.073
Researcher's Gender		
Proportion of female academics	0.022	0.056
Proportion of academics for whom gender is unknown	-0.240*	0.110
Researcher's Age Band		
Proportion of academics in the age band of 20 to 29	-0.009	0.135
Proportion of academics in the age band of 40 to 49	-0.099	0.074
Proportion of academics in the age band of 50 to 59	-0.002	0.082
Proportion of academics in the age band of 60 to 69	0.084	0.096
Proportion of academics in the age band of 70 and Over	0.603**	0.234
Proportion of academics for whom age band is unknown	-0.134	0.089
Researcher's Ethnicity		
Proportion of Asian academics	-0.239	0.137
Proportion of Māori academics	-0.915***	0.278
Proportion of Pasifika academics	-3.726***	0.640
Proportion of Middle Eastern/Latin American/African academics	0.311	0.365
Proportion of academics belonging to "other ethnicity"	0.097	0.073
Proportion of academics for whom ethnicity is unknown	0.311***	0.071
Student Level Characteristics		
Student's gender		
Female student	3.935**	1.345
Student's ethnicity		
Asian student	-9.251***	2.380
Māori student	-12.947***	3.493
Pasifika student	-25.427***	4.496
Middle Eastern/Latin American/African student	-17.556***	3.862
Student belonging to "other ethnicity"	-10.263**	3.317
Student for whom ethnicity is unknown	-2.439	5.156

Student's high school decile		
School decile 1	-7.986*	3.456
School decile 2	-2.862	3.455
School decile 3	-0.803	2.325
School decile 4	-1.737	2.086
School decile 6	0.027	2.122
School decile 7	0.682	2.107
School decile 8	3.596	2.387
School decile 9	5.424*	2.738
School decile 10	3.439	2.149
School decile missing	9.094	6.179
Level of NCEA achieved by the student		
Achieved less than NCEA level 3	-10.244***	1.938
Overseas equivalent to NCEA level 3	3.033	2.088
Missing observations on NCEA level achieved	-8.790	9.245
University fixed effects		
University 2	10.172*	4.929
University 3	-6.230	4.220
University 4	4.526	4.643
University 5	-7.479	3.968
University 6	-16.494***	4.430
University 7	4.309	3.676
University 8	-23.184***	6.012
Subject Area fixed effects		
Biomedical	14.008***	3.862
Chemistry	-6.365*	2.961
Earth Sciences	-0.234	2.797
Ecology, Evolution and Behaviour	0.663	2.996
Molecular, Cellular and Whole Organism Biology	-1.065	2.943
Physics	-7.500*	3.103

Year fixed effects		
First year at the tertiary education institute of the student – 1999	-2.838	3.104
First year at the tertiary education institute of the student – 2007	5.420	4.750
First year at the tertiary education institute of the student – 2008	5.482	4.736
constant	95.684***	9.852
Number of observations	3,954	

Notes: (1) The dependent variable is the *pass rate* of the student. (2) The robust standard errors which are clustered on the *id* (*id* is composed of evaluation year, university, and subject area) level. Standard errors are adjusted for 99 clusters in *id*. (3) The omitted category variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (4) The omitted category variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. I have estimated all the coefficients by using university, subject area, and year fixed effects. (5) I am not allowed to identify specific universities due to the 5.14.2 confidentiality entity clause set by Stats NZ. (6) Significance levels are indicated by: * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$.

Table 2.E.8: Determinants of Student Pass Rates; Subsample Analysis (Subject Area – Professions)

	Coefficient	Robust S.E.
PBRF Outcomes		
Proportion of academics attaining PBRF rank A	-0.123	0.125
Proportion of academics attaining PBRF rank B	-0.050	0.085
Proportion of academics attaining PBRF rank C(NE)	0.075	0.077
Proportion of academics attaining PBRF rank R	0.088	0.096
Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave	-0.106	0.090
Department Level Characteristics		
Researcher's Position Title		
Proportion of Professors	0.291**	0.105
Proportion of Associate Professors	0.085	0.089
Proportion of Lecturers	-0.047	0.078
Proportion of Other Teaching Staff	-0.081	0.121
Proportion of Other Non-Teaching Staff	0.247*	0.112
Researcher's Gender		
Proportion of female academics	-0.043	0.062
Proportion of academics for whom gender is unknown	0.200	0.157
Researcher's Age Band		
Proportion of academics in the age band of 20 to 29	-0.240	0.211
Proportion of academics in the age band of 40 to 49	-0.095	0.051
Proportion of academics in the age band of 50 to 59	-0.076	0.080
Proportion of academics in the age band of 60 to 69	0.144	0.097
Proportion of academics in the age band of 70 and Over	0.504	0.504
Proportion of academics for whom age band is unknown	-0.142	0.123
Researcher's Ethnicity		
Proportion of Asian academics	-0.063	0.088
Proportion of Māori academics	0.188*	0.075
Proportion of Pasifika academics	0.123	0.188
Proportion of Middle Eastern/Latin American/African academics	-0.192	0.309
Proportion of academics belonging to "other ethnicity"	-0.164	0.125
Proportion of academics for whom ethnicity is unknown	-0.158*	0.066
Student Level Characteristics		
Student's gender		
Female student	6.053***	0.657
Student's ethnicity		
Asian student	-7.772***	1.215
Māori student	-13.337***	1.281
Pasifika student	-20.519***	2.105
Middle Eastern/Latin American/African student	-12.131***	1.973
Student belonging to "other ethnicity"	-6.055***	1.671
Student for whom ethnicity is unknown	-10.371**	3.299

Student's high school decile		
School decile 1	-4.377**	1.626
School decile 2	-4.038**	1.429
School decile 3	-0.035	1.164
School decile 4	-0.913	1.191
School decile 6	0.799	0.988
School decile 7	0.675	1.038
School decile 8	0.630	1.070
School decile 9	-0.077	0.901
School decile 10	2.127*	0.939
School decile missing	-1.499	2.915
Level of NCEA achieved by the student		
Achieved less than NCEA level 3	-3.980***	1.056
Overseas equivalent to NCEA level 3	2.961	1.516
Missing observations on NCEA level achieved	-5.978**	2.137
University fixed effects		
University 2	-3.084	4.657
University 3	-0.700	3.837
University 4	4.495	3.336
University 5	-8.565*	3.702
University 6	-2.506	3.617
University 7	-3.959	2.989
University 8	0.598	5.927
Subject Area fixed effects		
Architecture, Design, Planning, Surveying	14.943***	3.278
Clinical Medicine	29.981***	3.269
Dentistry	18.432***	2.991
Design	30.378***	5.166
Education	6.529	3.738
Engineering and Technology	3.141	3.033
Law	7.888*	3.321
Other Health Studies (including Rehabilitation Therapies)	11.081**	3.726
Sport and Exercise Science	1.747	3.570
Veterinary Studies and Large Animal Science	11.862*	5.052

Year fixed effects		
First year at the tertiary education institute of the student – 1999	1.501	1.632
First year at the tertiary education institute of the student – 2007	-10.891**	4.253
First year at the tertiary education institute of the student – 2008	-10.708*	4.266
constant	110.982***	9.166
Number of observations	15,150	

Notes: (1) The dependent variable is the *pass rate* of the student. (2) The robust standard errors which are clustered on the *id* (*id* is composed of evaluation year, university, and subject area) level. Standard errors are adjusted for 123 clusters in *id*. (3) The omitted category variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (4) The omitted category variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. I have estimated all the coefficients by using university, subject area, and year fixed effects. (5) I am not allowed to identify specific universities due to the 5.14.2 confidentiality entity clause set by Stats NZ. (6) Significance levels are indicated by: * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$.

Table 2.E.9: Determinants of Student Pass Rates; Subsample Analysis (Subject Area – Social Sciences)

	Coefficient	Robust S.E.
PBRF Outcomes		
Proportion of academics attaining PBRF rank A	0.088	0.124
Proportion of academics attaining PBRF rank B	-0.064	0.073
Proportion of academics attaining PBRF rank C(NE)	-0.258*	0.123
Proportion of academics attaining PBRF rank R	-0.160	0.166
Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave	-0.048	0.147
Department Level Characteristics		
Researcher's Position Title		
Proportion of Professors	0.048	0.134
Proportion of Associate Professors	0.216	0.171
Proportion of Lecturers	0.231*	0.098
Proportion of Other Teaching Staff	0.197	0.164
Proportion of Other Non-Teaching Staff	0.039	0.085
Researcher's Gender		
Proportion of female academics	-0.101	0.063
Proportion of academics for whom gender is unknown	-0.254*	0.116
Researcher's Age Band		
Proportion of academics in the age band of 20 to 29	0.511	0.299
Proportion of academics in the age band of 40 to 49	-0.074	0.096
Proportion of academics in the age band of 50 to 59	-0.033	0.100
Proportion of academics in the age band of 60 to 69	-0.127	0.106
Proportion of academics in the age band of 70 and Over	-0.462*	0.198
Proportion of academics for whom age band is unknown	0.115	0.087
Researcher's Ethnicity		
Proportion of Asian academics	0.044	0.174
Proportion of Māori academics	-0.400**	0.137
Proportion of Pasifika academics	-0.806***	0.183
Proportion of Middle Eastern/Latin American/African academics	0.056	0.367
Proportion of academics belonging to "other ethnicity"	-0.035	0.063
Proportion of academics for whom ethnicity is unknown	0.058	0.063
Student Level Characteristics		
Student's gender		
Female student	9.961***	1.151
Student's ethnicity		
Asian student	-10.520***	1.187
Māori student	-14.920***	1.760
Pasifika student	-24.374***	1.930
Middle Eastern/Latin American/African student	-11.532***	2.293
Student belonging to "other ethnicity"	-5.006*	2.109
Student for whom ethnicity is unknown	8.427	8.923

Student's high school decile		
School decile 1	-5.257*	2.553
School decile 2	-1.355	2.770
School decile 3	-1.209	1.924
School decile 4	1.042	1.806
School decile 6	1.568	1.705
School decile 7	3.350	1.882
School decile 8	3.612*	1.512
School decile 9	4.027**	1.479
School decile 10	3.997*	1.705
School decile missing	-1.919	4.093
Level of NCEA achieved by the student		
Achieved less than NCEA level 3	-8.867***	1.443
Overseas equivalent to NCEA level 3	2.675	1.891
Missing observations on NCEA level achieved	-10.978**	4.063
University fixed effects		
University 2	-26.129***	7.393
University 3	-11.079**	4.082
University 4	-11.140**	3.843
University 5	-22.622***	3.637
University 6	-25.724***	3.836
University 7	-5.197	3.085
University 8	-29.798***	6.005
Subject Area fixed effects		
Communications, Journalism and Media Studies	6.888	3.932
Economics	0.738	3.859
Human Geography	9.864**	3.737
Political Science, International Relations and Public Policy	6.639*	2.653
Psychology	5.940	3.073
Public Health	20.689***	4.781
Sociology, Social Policy, Social Work, Criminology and Gender Studies	5.156	2.646

Year fixed effects		
First year at the tertiary education institute of the student – 1999	2.855	1.872
First year at the tertiary education institute of the student – 2007	12.441**	4.273
First year at the tertiary education institute of the student – 2008	12.813**	4.188
constant	99.625***	8.908
Number of observations	7,398	

Notes: (1) The dependent variable is the *pass rate* of the student. (2) The robust standard errors which are clustered on the *id* (*id* is composed of evaluation year, university, and subject area) level. Standard errors are adjusted for 114 clusters in *id*. (3) The omitted category variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (4) The omitted category variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. I have estimated all the coefficients by using university, subject area, and year fixed effects. (5) I am not allowed to identify specific universities due to the 5.14.2 confidentiality entity clause set by Stats NZ. (6) Significance levels are indicated by: * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$.

Appendix 2F: Determinants of Student Pass Rates; Subsample Analysis – Tobit Estimation for Minimum 3 EFTS Attempted; Balanced 2003 and 2012 Sample Size; Subject Area excluding Education; NCEA Level Achieved and Student's Ethnicity

Table 2.F.1: Determinants of Student Pass Rates; Subsample Analysis (Minimum 3 EFTS Attempted)

	Coefficient	Robust S.E.
PBRF Outcomes		
Proportion of academics attaining PBRF rank A	-0.088	0.064
Proportion of academics attaining PBRF rank B	-0.041	0.039
Proportion of academics attaining PBRF rank C(NE)	-0.058	0.050
Proportion of academics attaining PBRF rank R	0.078	0.071
Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave	0.066	0.059
Department Level Characteristics		
Researcher's Position Title		
Proportion of Professors	0.109	0.058
Proportion of Associate Professors	0.026	0.054
Proportion of Lecturers	-0.026	0.037
Proportion of Other Teaching Staff	0.052	0.079
Proportion of Other Non-Teaching Staff	0.033	0.043
Researcher's Gender		
Proportion of female academics	0.014	0.028
Proportion of academics for whom gender is unknown	-0.038	0.061
Researcher's Age Band		
Proportion of academics in the age band of 20 to 29	0.011	0.132
Proportion of academics in the age band of 40 to 49	-0.064	0.036
Proportion of academics in the age band of 50 to 59	-0.112**	0.043
Proportion of academics in the age band of 60 to 69	-0.001	0.047
Proportion of academics in the age band of 70 and Over	-0.173	0.122
Proportion of academics for whom age band is unknown	0.003	0.056
Researcher's Ethnicity		
Proportion of Asian academics	-0.048	0.046
Proportion of Māori academics	0.007	0.047
Proportion of Pasifika academics	0.125	0.111
Proportion of Middle Eastern/Latin American/African academics	-0.094	0.150
Proportion of academics belonging to "other ethnicity"	0.013	0.036
Proportion of academics for whom ethnicity is unknown	0.025	0.034
Student Level Characteristics		
Student's gender		
Female student	5.362***	0.449
Student's ethnicity		
Asian student	-8.122***	0.738
Māori student	-8.951***	0.890
Pasifika student	-18.462***	1.124
Middle Eastern/Latin American/African student	-10.811***	1.243
Student belonging to "other ethnicity"	-6.922***	0.896
Student for whom ethnicity is unknown	-4.471*	2.209

Student's high school decile		
School decile 1	-4.616***	1.261
School decile 2	-3.353**	1.180
School decile 3	-0.502	0.794
School decile 4	-0.749	0.807
School decile 6	-0.018	0.700
School decile 7	0.226	0.679
School decile 8	0.666	0.643
School decile 9	0.519	0.640
School decile 10	1.285*	0.640
School decile missing	-0.457	1.966
Level of NCEA achieved by the student		
Achieved less than NCEA level 3	-3.183***	0.604
Overseas equivalent to NCEA level 3	2.166**	0.796
Missing observations on NCEA level achieved	-6.206***	1.757
University fixed effects		
University 2	-8.568***	2.574
University 3	-5.976**	2.216
University 4	-3.377	2.284
University 5	-10.716***	2.211
University 6	-12.958***	2.277
University 7	-1.989	2.220
University 8	-11.403***	2.505
Subject Area fixed effects		
Agriculture and Other Applied Biological Sciences	2.165	2.450
Anthropology and Archaeology	-7.540**	2.504
Architecture, Design, Planning, Surveying	10.995***	1.915
Biomedical	4.216	3.722
Chemistry	-6.797**	2.500
Clinical Medicine	32.668***	4.703
Communications, Journalism and Media Studies	3.320	2.963
Computer Science, Information Technology, Information Sciences	-5.715***	1.704
Dentistry	21.352***	1.972
Design	15.372***	4.048
Earth Sciences	-0.124	2.620
Ecology, Evolution and Behaviour	0.645	2.356
Economics	-0.935	1.360
Education	6.073**	2.049
Engineering and Technology	4.082	2.996
English Language and Literature	-3.679	2.162
Foreign Languages and Linguistics	1.323	2.212
History, History of Art, Classics and Curatorial Studies	-3.015	1.577
Human Geography	2.596	2.289
Law	8.701***	2.156
Management, Human Resources, Industrial Relations, International Business and Other Business	-2.009	1.685
Marketing and Tourism	-0.245	1.256
Molecular, Cellular and Whole Organism Biology	-1.374	2.315
Music, Literary Arts and Other Arts	4.679	2.729
Māori Knowledge and Development	-2.977	4.289
Other Health Studies (including Rehabilitation Therapies)	12.035***	2.634
Philosophy	-6.674**	2.155
Physics	-2.109	2.547
Political Science, International Relations and Public Policy	-1.325	2.076
Psychology	0.265	2.300

Public Health	-2.952	3.858
Pure and Applied Mathematics	-5.714*	2.821
Religious Studies and Theology	-7.402**	2.720
Sociology, Social Policy, Social Work, Criminology and Gender Studies	-2.521	2.093
Sport and Exercise Science	3.020	1.866
Statistics	-10.558***	2.395
Theatre and Dance, Film and Television and Multimedia	2.591	3.918
Veterinary Studies and Large Animal Science	10.115*	4.104
Visual Arts and Crafts	15.187***	2.573
Year fixed effects		
First year at the tertiary education institute of the student – 1999	3.030*	1.317
First year at the tertiary education institute of the student – 2007	9.774***	2.422
First year at the tertiary education institute of the student – 2008	9.924***	2.414
constant	100.701***	4.716
Number of observations	25,962	

Notes: (1) The dependent variable is the *pass rate* of the student. (2) The robust standard errors which are clustered on the *id* (*id* is composed of evaluation year, university, and subject area) level. Standard errors are adjusted for 485 clusters in *id*. (3) The omitted category variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (4) The omitted category variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. I have estimated all the coefficients by using university, subject area, and year fixed effects. (5) I am not allowed to identify specific universities due to the 5.14.2 confidentiality entity clause set by Stats NZ. (6) Significance levels are indicated by: * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$.

Table 2.F.2: Determinants of Student Pass Rates; Subsample Analysis (balanced 2003 and 2012 sample size)

	Coefficient	Robust S.E.
PBRF Outcomes		
Proportion of academics attaining PBRF rank A	-0.049	0.081
Proportion of academics attaining PBRF rank B	-0.031	0.051
Proportion of academics attaining PBRF rank C(NE)	0.067	0.072
Proportion of academics attaining PBRF rank R	0.057	0.061
Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave	-0.002	0.061
Department Level Characteristics		
Researcher's Position Title		
Proportion of Professors	0.075	0.072
Proportion of Associate Professors	0.010	0.065
Proportion of Lecturers	-0.022	0.052
Proportion of Other Teaching Staff	0.029	0.099
Proportion of Other Non-Teaching Staff	-0.010	0.058
Researcher's Gender		
Proportion of female academics	-0.049	0.038
Proportion of academics for whom gender is unknown	-0.018	0.063
Researcher's Age Band		
Proportion of academics in the age band of 20 to 29	0.114	0.143
Proportion of academics in the age band of 40 to 49	-0.055	0.048
Proportion of academics in the age band of 50 to 59	0.007	0.058
Proportion of academics in the age band of 60 to 69	0.015	0.062
Proportion of academics in the age band of 70 and Over	-0.211	0.169
Proportion of academics for whom age band is unknown	0.011	0.057
Researcher's Ethnicity		
Proportion of Asian academics	-0.126	0.065
Proportion of Māori academics	-0.044	0.070
Proportion of Pasifika academics	-0.024	0.179
Proportion of Middle Eastern/Latin American/African academics	-0.029	0.250
Proportion of academics belonging to "other ethnicity"	-0.003	0.044
Proportion of academics for whom ethnicity is unknown	-0.003	0.040
Student Level Characteristics		
Student's gender		
Female student	8.450***	0.790
Student's ethnicity		
Asian student	-11.658***	1.055
Māori student	-15.273***	1.416
Pasifika student	-26.217***	1.812
Middle Eastern/Latin American/African student	-13.555***	3.057
Student belonging to "other ethnicity"	-9.008***	1.564
Student for whom ethnicity is unknown	-10.48**	3.632

Student's high school decile		
School decile 1	-5.931**	2.238
School decile 2	-3.283	1.811
School decile 3	-2.191	1.367
School decile 4	-1.945	1.369
School decile 6	-0.099	1.242
School decile 7	0.984	1.171
School decile 8	1.807	1.232
School decile 9	2.072	1.143
School decile 10	2.794*	1.122
School decile missing	8.279	4.326
Level of NCEA achieved by the student		
Achieved less than NCEA level 3	-5.848***	0.916
Overseas equivalent to NCEA level 3	0.829	1.475
Missing observations on NCEA level achieved	-9.292***	2.166
University fixed effects		
University 2	-11.231**	3.752
University 3	-10.672**	3.522
University 4	-5.345	3.391
University 5	-19.616***	3.384
University 6	-20.291***	3.358
University 7	-2.951	3.064
University 8	-16.637***	3.597
Subject Area fixed effects		
Agriculture and Other Applied Biological Sciences	0.481	2.871
Anthropology and Archaeology	-9.381*	4.530
Architecture, Design, Planning, Surveying	17.633***	3.039
Biomedical	6.251	4.211
Chemistry	-9.275*	4.637
Clinical Medicine	51.902***	2.594
Communications, Journalism and Media Studies	1.772	4.137
Computer Science, Information Technology, Information Sciences	-5.629**	2.190
Dentistry	29.514***	2.881
Design	20.036***	4.842
Earth Sciences	2.177	3.751
Ecology, Evolution and Behaviour	0.927	4.070
Economics	-3.951	2.355
Education	9.156**	2.996
Engineering and Technology	4.918	3.515
English Language and Literature	-5.271	2.733
Foreign Languages and Linguistics	2.553	3.529
History, History of Art, Classics and Curatorial Studies	-7.091*	2.891
Human Geography	3.869	3.512
Law	12.346***	2.835

Management, Human Resources, Industrial Relations, International Business and Other Business	-2.467	2.630
Marketing and Tourism	2.385	1.941
Molecular, Cellular and Whole Organism Biology	1.770	4.016
Music, Literary Arts and Other Arts	6.877	5.154
Māori Knowledge and Development	8.320	7.363
Other Health Studies (including Rehabilitation Therapies)	16.560***	3.868
Philosophy	-11.879***	3.374
Physics	-2.520	3.498
Political Science, International Relations and Public Policy	-4.828	3.259
Psychology	-0.931	3.202
Public Health	4.145	6.266
Pure and Applied Mathematics	-14.789***	3.103
Religious Studies and Theology	-8.750	4.655
Sociology, Social Policy, Social Work, Criminology and Gender Studies	-5.568	3.481
Sport and Exercise Science	1.699	3.835
Statistics	-13.372***	2.657
Theatre and Dance, Film and Television and Multimedia	1.534	5.532
Veterinary Studies and Large Animal Science	13.472	7.147
Visual Arts and Crafts	19.429***	5.316
Year fixed effects		
First year at the tertiary education institute of the student – 1999	2.041*	1.001
First year at the tertiary education institute of the student – 2007	1.966	2.419
First year at the tertiary education institute of the student – 2008	3.208	2.398
constant	110.702***	6.192
Number of observations	14,259	

Notes: (1) The dependent variable is the *pass rate* of the student. (2) The robust standard errors which are clustered on the *id* (*id* is composed of evaluation year, university, and subject area) level. Standard errors are adjusted for 506 clusters in *id*. (3) The omitted category variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (4) The omitted category variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. I have estimated all the coefficients by using university, subject area, and year fixed effects. (5) I am not allowed to identify specific universities due to the 5.14.2 confidentiality entity clause set by Stats NZ. (6) Significance levels are indicated by: * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$.

Table 2.F.3: Determinants of Student Pass Rates; Subsample Analysis (Subject Area excluding Education)

	Coefficient	Robust S.E.
PBRF Outcomes		
Proportion of academics attaining PBRF rank A	-0.016	0.073
Proportion of academics attaining PBRF rank B	-0.032	0.045
Proportion of academics attaining PBRF rank C(NE)	-0.048	0.061
Proportion of academics attaining PBRF rank R	0.025	0.065
Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave	-0.005	0.059
Department Level Characteristics		
Researcher's Position Title		
Proportion of Professors	0.089	0.065
Proportion of Associate Professors	-0.023	0.062
Proportion of Lecturers	-0.001	0.044
Proportion of Other Teaching Staff	0.006	0.097
Proportion of Other Non-Teaching Staff	0.040	0.052
Researcher's Gender		
Proportion of female academics	0.008	0.033
Proportion of academics for whom gender is unknown	-0.001	0.065
Researcher's Age Band		
Proportion of academics in the age band of 20 to 29	0.031	0.137
Proportion of academics in the age band of 40 to 49	-0.056	0.039
Proportion of academics in the age band of 50 to 59	-0.113*	0.049
Proportion of academics in the age band of 60 to 69	-0.010	0.052
Proportion of academics in the age band of 70 and Over	-0.227	0.157
Proportion of academics for whom age band is unknown	-0.019	0.059
Researcher's Ethnicity		
Proportion of Asian academics	-0.101	0.055
Proportion of Māori academics	-0.069	0.054
Proportion of Pasifika academics	0.027	0.127
Proportion of Middle Eastern/Latin American/African academics	-0.086	0.199
Proportion of academics belonging to "other ethnicity"	-0.013	0.038
Proportion of academics for whom ethnicity is unknown	0.000	0.038
Student Level Characteristics		
Student's gender		
Female student	6.818***	0.511
Student's ethnicity		
Asian student	-9.051***	0.764
Māori student	-13.500***	0.894
Pasifika student	-22.964***	1.185
Middle Eastern/Latin American/African student	-12.399***	1.358
Student belonging to "other ethnicity"	-7.110***	1.016
Student for whom ethnicity is unknown	-4.878*	2.431
Student's high school decile		
School decile 1	-6.485***	1.324
School decile 2	-3.940***	1.214
School decile 3	-0.724	0.845
School decile 4	-0.928	0.828
School decile 6	0.365	0.775
School decile 7	0.786	0.756
School decile 8	1.691*	0.732
School decile 9	1.478*	0.727
School decile 10	2.725***	0.699

School decile missing	1.817	2.144
Level of NCEA achieved by the student		
Achieved less than NCEA level 3	-7.029***	0.727
Overseas equivalent to NCEA level 3	2.490**	0.904
Missing observations on NCEA level achieved	-10.169***	1.870
University fixed effects		
University 2	-11.983***	2.743
University 3	-10.622***	2.709
University 4	-6.345*	2.493
University 5	-17.376***	2.592
University 6	-18.167***	2.546
University 7	-5.059*	2.400
University 8	-16.336***	2.907
Subject Area fixed effects		
Agriculture and Other Applied Biological Sciences	1.806	2.701
Anthropology and Archaeology	-9.533***	2.976
Architecture, Design, Planning, Surveying	13.748***	2.503
Biomedical	3.375	4.656
Chemistry	-10.370***	3.088
Clinical Medicine	37.430***	4.407
Communications, Journalism and Media Studies	1.482	3.318
Computer Science, Information Technology, Information Sciences	-7.656***	1.910
Dentistry	22.991***	2.385
Design	20.000***	4.283
Earth Sciences	-1.665	3.151
Ecology, Evolution and Behaviour	-2.442	3.502
Economics	-2.029	1.686
Engineering and Technology	3.736	3.073
English Language and Literature	-3.382	2.213
Foreign Languages and Linguistics	-0.378	2.680
History, History of Art, Classics and Curatorial Studies	-5.670**	2.105
Human Geography	-0.519	2.884
Law	9.005***	2.493
Management, Human Resources, Industrial Relations, International Business and Other Business	-4.229	2.352
Marketing and Tourism	-0.214	1.646
Molecular, Cellular and Whole Organism Biology	-3.827	3.205
Music, Literary Arts and Other Arts	3.366	3.961
Māori Knowledge and Development	0.296	5.049
Other Health Studies (including Rehabilitation Therapies)	12.059***	3.167
Philosophy	-11.666***	2.667
Physics	-2.953	3.008
Political Science, International Relations and Public Policy	-3.000	2.634
Psychology	-2.417	2.774
Public Health	-2.353	4.667
Pure and Applied Mathematics	-12.463***	2.665
Religious Studies and Theology	-8.685**	3.001
Sociology, Social Policy, Social Work, Criminology and Gender Studies	-6.593**	2.558
Sport and Exercise Science	0.435	2.543
Statistics	-14.504***	2.401
Theatre and Dance, Film and Television and Multimedia	2.053	3.874
Veterinary Studies and Large Animal Science	10.124*	4.609
Visual Arts and Crafts	15.810***	3.696
Year fixed effects		

First year at the tertiary education institute of the student – 1999	1.970	1.041
First year at the tertiary education institute of the student – 2007	3.801	2.315
First year at the tertiary education institute of the student – 2008	3.584	2.316
constant	113.345***	5.149
Number of observations	34,578	

Notes: (1) The dependent variable is the *pass rate* of the student. (2) The robust standard errors which are clustered on the *id* (*id* is composed of evaluation year, university, and subject area) level. Standard errors are adjusted for 517 clusters in *id*. (3) The omitted category variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (4) The omitted category variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. I have estimated all the coefficients by using university, subject area, and year fixed effects. (5) I am not allowed to identify specific universities due to the 5.14.2 confidentiality entity clause set by Stats NZ. (6) Significance levels are indicated by: * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$.

Table 2.F.4: Determinants of Student Pass Rates; Subsample Analysis (NCEA less than level 3 achieved)

	Coefficient	Robust S.E.
PBRF Outcomes		
Proportion of academics attaining PBRF rank A	-0.001	0.098
Proportion of academics attaining PBRF rank B	-0.050	0.054
Proportion of academics attaining PBRF rank C(NE)	-0.051	0.084
Proportion of academics attaining PBRF rank R	-0.017	0.068
Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave	-0.047	0.060
Department Level Characteristics		
Researcher's Position Title		
Proportion of Professors	0.016	0.080
Proportion of Associate Professors	0.020	0.078
Proportion of Lecturers	-0.034	0.058
Proportion of Other Teaching Staff	0.041	0.127
Proportion of Other Non-Teaching Staff	0.018	0.063
Researcher's Gender		
Proportion of female academics	0.001	0.049
Proportion of academics for whom gender is unknown	-0.002	0.074
Researcher's Age Band		
Proportion of academics in the age band of 20 to 29	-0.110	0.176
Proportion of academics in the age band of 40 to 49	-0.087	0.054
Proportion of academics in the age band of 50 to 59	-0.057	0.066
Proportion of academics in the age band of 60 to 69	0.015	0.069
Proportion of academics in the age band of 70 and Over	-0.034	0.203
Proportion of academics for whom age band is unknown	-0.058	0.067
Researcher's Ethnicity		
Proportion of Asian academics	-0.062	0.066
Proportion of Māori academics	-0.037	0.059
Proportion of Pasifika academics	-0.144	0.150
Proportion of Middle Eastern/Latin American/African academics	-0.372	0.250
Proportion of academics belonging to "other ethnicity"	-0.034	0.064
Proportion of academics for whom ethnicity is unknown	0.013	0.047
Student Level Characteristics		
Student's gender		
Female student	8.050***	0.766
Student's ethnicity		
Asian student	-11.479***	0.966
Māori student	-13.825***	1.518
Pasifika student	-27.031***	1.662
Middle Eastern/Latin American/African student	-12.973***	2.930
Student belonging to "other ethnicity"	-7.515***	2.008
Student for whom ethnicity is unknown	-4.457	3.570

Student's high school decile		
School decile 1	-3.717	1.983
School decile 2	-1.854	2.054
School decile 3	1.351	1.567
School decile 4	0.014	1.544
School decile 6	0.946	1.393
School decile 7	2.134	1.396
School decile 8	3.611*	1.487
School decile 9	2.531	1.370
School decile 10	5.110***	1.493
School decile missing	5.204	4.466
University fixed effects		
University 2	-13.260***	2.775
University 3	-14.780***	2.530
University 4	-6.543**	2.452
University 5	-20.905***	2.468
University 6	-28.143***	2.375
University 7	-7.988***	2.058
University 8	-21.696***	2.965
Subject Area fixed effects		
Agriculture and Other Applied Biological Sciences	1.792	3.387
Anthropology and Archaeology	-12.099**	4.668
Architecture, Design, Planning, Surveying	14.411***	3.486
Biomedical	-2.005	6.994
Chemistry	-16.811***	4.948
Clinical Medicine	38.498***	2.648
Communications, Journalism and Media Studies	5.616	3.551
Computer Science, Information Technology, Information Sciences	-2.252	3.270
Dentistry	28.049***	3.254
Design	22.649***	4.240
Earth Sciences	1.790	4.007
Ecology, Evolution and Behaviour	-5.984	6.757
Economics	-3.780	2.715
Education	12.737***	3.037
Engineering and Technology	8.767*	4.109
English Language and Literature	-6.249*	3.094
Foreign Languages and Linguistics	1.017	2.894
History, History of Art, Classics and Curatorial Studies	-5.852	3.662
Human Geography	4.251	5.922
Law	10.946**	4.028
Management, Human Resources, Industrial Relations, International Business and Other Business	-2.412	2.775
Marketing and Tourism	2.981	1.859
Molecular, Cellular and Whole Organism Biology	-11.645***	3.115

Music, Literary Arts and Other Arts	4.537	5.585
Māori Knowledge and Development	2.741	5.581
Other Health Studies (including Rehabilitation Therapies)	9.539**	3.416
Philosophy	-15.051***	3.641
Physics	3.391	4.888
Political Science, International Relations and Public Policy	-6.459	3.602
Psychology	-2.720	3.294
Public Health	1.537	7.030
Pure and Applied Mathematics	-16.884***	3.067
Religious Studies and Theology	-9.250*	4.485
Sociology, Social Policy, Social Work, Criminology and Gender Studies	-8.408*	3.743
Sport and Exercise Science	1.840	3.419
Statistics	-17.685***	4.578
Theatre and Dance, Film and Television and Multimedia	-13.318*	5.324
Veterinary Studies and Large Animal Science	8.153	6.283
Visual Arts and Crafts	22.389***	4.688
Year fixed effects		
First year at the tertiary education institute of the student – 1999	2.249	1.465
First year at the tertiary education institute of the student – 2007	-0.846	3.013
First year at the tertiary education institute of the student – 2008	-1.024	2.958
constant	113.433***	6.484
Number of observations	10,485	

Notes: (1) The dependent variable is the *pass rate* of the student. (2) The robust standard errors which are clustered on the *id* (*id* is composed of evaluation year, university, and subject area) level. Standard errors are adjusted for 490 clusters in *id*. (3) The omitted category variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (4) The omitted category variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. I have estimated all the coefficients by using university, subject area, and year fixed effects. (5) I am not allowed to identify specific universities due to the 5.14.2 confidentiality entity clause set by Stats NZ. (6) Significance levels are indicated by: * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$.

Table 2.F.5: Determinants of Student Pass Rates; Subsample Analysis (NCEA Level 3 Achieved)

	Coefficient	Robust S.E.
PBRF Outcomes		
Proportion of academics attaining PBRF rank A	0.010	0.064
Proportion of academics attaining PBRF rank B	0.011	0.038
Proportion of academics attaining PBRF rank C(NE)	-0.007	0.055
Proportion of academics attaining PBRF rank R	0.079	0.077
Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave	0.061	0.071
Department Level Characteristics		
Researcher's Position Title		
Proportion of Professors	0.093	0.060
Proportion of Associate Professors	-0.042	0.060
Proportion of Lecturers	-0.039	0.046
Proportion of Other Teaching Staff	0.019	0.088
Proportion of Other Non-Teaching Staff	0.008	0.053
Researcher's Gender		
Proportion of female academics	0.016	0.032
Proportion of academics for whom gender is unknown	0.006	0.070
Researcher's Age Band		
Proportion of academics in the age band of 20 to 29	-0.031	0.137
Proportion of academics in the age band of 40 to 49	-0.063	0.041
Proportion of academics in the age band of 50 to 59	-0.161***	0.048
Proportion of academics in the age band of 60 to 69	-0.038	0.050
Proportion of academics in the age band of 70 and Over	-0.309*	0.149
Proportion of academics for whom age band is unknown	-0.022	0.057
Researcher's Ethnicity		
Proportion of Asian academics	-0.102	0.053
Proportion of Māori academics	-0.011	0.057
Proportion of Pasifika academics	0.151	0.129
Proportion of Middle Eastern/Latin American/African academics	0.068	0.195
Proportion of academics belonging to "other ethnicity"	-0.008	0.037
Proportion of academics for whom ethnicity is unknown	-0.031	0.039
Student Level Characteristics		
Student's gender		
Female student	6.558***	0.532
Student's ethnicity		
Asian student	-8.860***	0.846
Māori student	-12.979***	1.087
Pasifika student	-20.719***	1.416
Middle Eastern/Latin American/African student	-9.707***	1.789
Student belonging to "other ethnicity"	-6.821***	1.289
Student for whom ethnicity is unknown	-3.391	2.613

Student's high school decile		
School decile 1	-8.032***	1.599
School decile 2	-4.531***	1.419
School decile 3	-1.897*	0.870
School decile 4	-1.352	0.912
School decile 6	0.300	0.820
School decile 7	0.697	0.807
School decile 8	0.930	0.780
School decile 9	0.160	0.788
School decile 10	1.503*	0.742
School decile missing	-3.016	3.729
University fixed effects		
University 2	-5.936	3.036
University 3	-2.382	2.962
University 4	-0.436	2.650
University 5	-10.777***	2.743
University 6	-9.266***	2.684
University 7	1.302	2.632
University 8	-8.738**	3.138
Subject Area fixed effects		
Agriculture and Other Applied Biological Sciences	1.720	2.755
Anthropology and Archaeology	-8.104*	3.460
Architecture, Design, Planning, Surveying	14.048***	2.193
Biomedical	5.402	3.425
Chemistry	-8.423*	3.362
Clinical Medicine	35.694***	4.256
Communications, Journalism and Media Studies	-2.572	3.044
Computer Science, Information Technology, Information Sciences	-8.687***	1.907
Dentistry	19.970***	2.340
Design	18.125***	5.084
Earth Sciences	-2.330	3.124
Ecology, Evolution and Behaviour	-2.384	2.996
Economics	-2.752	1.572
Education	3.030	2.385
Engineering and Technology	3.017	3.013
English Language and Literature	-2.744	2.441
Foreign Languages and Linguistics	-0.870	2.812
History, History of Art, Classics and Curatorial Studies	-6.134**	2.071
Human Geography	-3.169	2.548
Law	7.320**	2.391
Management, Human Resources, Industrial Relations, International Business and Other Business	-5.272*	2.155
Marketing and Tourism	-1.272	1.549
Molecular, Cellular and Whole Organism Biology	-2.418	3.082

Music, Literary Arts and Other Arts	4.166	3.558
Māori Knowledge and Development	-9.734	5.723
Other Health Studies (including Rehabilitation Therapies)	12.509***	2.923
Philosophy	-10.085***	2.484
Physics	-4.892	2.868
Political Science, International Relations and Public Policy	-1.814	2.459
Psychology	-3.107	2.611
Public Health	-3.867	3.890
Pure and Applied Mathematics	-11.415***	2.943
Religious Studies and Theology	-8.687***	2.709
Sociology, Social Policy, Social Work, Criminology and Gender Studies	-5.709*	2.287
Sport and Exercise Science	-1.063	2.358
Statistics	-13.386***	2.102
Theatre and Dance, Film and Television and Multimedia	6.320	3.718
Veterinary Studies and Large Animal Science	9.805	5.340
Visual Arts and Crafts	12.959***	3.208
Year fixed effects		
First year at the tertiary education institute of the student – 1999	1.995	1.422
First year at the tertiary education institute of the student – 2007	4.659	2.727
First year at the tertiary education institute of the student – 2008	4.519	2.725
constant	106.610***	5.467
Number of observations	24,858	

Notes: (1) The dependent variable is the *pass rate* of the student. (2) The robust standard errors which are clustered on the *id* (*id* is composed of evaluation year, university, and subject area) level. Standard errors are adjusted for 502 clusters in *id*. (3) The omitted category variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (4) The omitted category variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. I have estimated all the coefficients by using university, subject area, and year fixed effects. (5) I am not allowed to identify specific universities due to the 5.14.2 confidentiality entity clause set by Stats NZ. (6) Significance levels are indicated by: * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$.

Table 2.F.6: Determinants of Student Pass Rates; Subsample Analysis (Overseas Equivalent NCEA Level 3 Achieved)

	Coefficient	Robust S.E.
PBRF Outcomes		
Proportion of academics attaining PBRF rank A	-0.001	0.204
Proportion of academics attaining PBRF rank B	0.131	0.134
Proportion of academics attaining PBRF rank C(NE)	-0.185	0.159
Proportion of academics attaining PBRF rank R	0.570**	0.221
Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave	0.722*	0.315
Department Level Characteristics		
Researcher's Position Title		
Proportion of Professors	0.126	0.169
Proportion of Associate Professors	0.166	0.165
Proportion of Lecturers	0.071	0.113
Proportion of Other Teaching Staff	-0.560	0.333
Proportion of Other Non-Teaching Staff	0.239	0.124
Researcher's Gender		
Proportion of female academics	0.038	.
Proportion of academics for whom gender is unknown	0.172	0.282
Researcher's Age Band		
Proportion of academics in the age band of 20 to 29	-0.790	0.461
Proportion of academics in the age band of 40 to 49	-0.459**	0.146
Proportion of academics in the age band of 50 to 59	-0.452**	0.171
Proportion of academics in the age band of 60 to 69	-0.149	0.166
Proportion of academics in the age band of 70 and Over	-1.180**	0.428
Proportion of academics for whom age band is unknown	-0.102	0.227
Researcher's Ethnicity		
Proportion of Asian academics	-0.082	0.174
Proportion of Māori academics	-0.157	0.402
Proportion of Pasifika academics	-0.429	0.477
Proportion of Middle Eastern/Latin American/African academics	-1.085**	0.351
Proportion of academics belonging to "other ethnicity"	0.285	0.148
Proportion of academics for whom ethnicity is unknown	0.067	0.161
Student Level Characteristics		
Student's gender		
Female student	5.335***	1.242
Student's ethnicity		
Asian student	-4.385***	1.230
Māori student	-8.760	5.938
Pasifika student	-11.607**	4.208
Middle Eastern/Latin American/African student	-17.319***	5.194
Student belonging to "other ethnicity"	-1.684	3.812
Student for whom ethnicity is unknown	-1.974	5.298
Student's high school decile		
School decile 1	-23.388	13.303
School decile 2	-6.299	8.088
School decile 3	1.689	7.831
School decile 4	2.495	9.356
School decile 6	3.983	7.737
School decile 7	-2.714	7.386
School decile 8	5.950	7.687

School decile 9	7.689	7.351
School decile 10	4.581	7.356
School decile missing	9.180	7.547
University fixed effects		
University 2	-11.702	12.489
University 3	-3.921	4.797
University 4	-6.519	5.740
University 5	-8.204	5.042
University 6	-2.356	5.853
University 7	13.649	7.862
University 8	-15.010	9.407
Subject Area fixed effects		
Agriculture and Other Applied Biological Sciences	1.314	6.086
Anthropology and Archaeology	11.317	17.467
Architecture, Design, Planning, Surveying	18.771**	6.606
Biomedical	-2.588	8.776
Chemistry	-10.836	10.841
Clinical Medicine	17.492***	5.126
Communications, Journalism and Media Studies	4.056	8.201
Computer Science, Information Technology, Information Sciences	-5.808	5.828
Dentistry	13.293	6.881
Design	25.477**	8.268
Earth Sciences	-9.507	6.331
Ecology, Evolution and Behaviour	-3.153	10.006
Economics	-5.926	4.559
Education	13.370	8.861
Engineering and Technology	-5.705	9.839
English Language and Literature	-9.444	7.824
Foreign Languages and Linguistics	2.634	7.046
History, History of Art, Classics and Curatorial Studies	-3.346	6.482
Human Geography	100.705***	12.742
Law	11.127	6.653
Management, Human Resources, Industrial Relations, International Business and Other Business	-2.237	5.812
Marketing and Tourism	-5.524	4.437
Molecular, Cellular and Whole Organism Biology	-10.419	7.673
Music, Literary Arts and Other Arts	5.269	10.509
Māori Knowledge and Development	44.696	33.133
Other Health Studies (including Rehabilitation Therapies)	5.823	8.561
Philosophy	-8.779	7.521
Physics	-14.544	8.683
Political Science, International Relations and Public Policy	-6.392	7.600
Psychology	-5.797	8.638
Public Health	-6.360	8.424
Pure and Applied Mathematics	-8.317	6.689
Religious Studies and Theology	4.744	27.506
Sociology, Social Policy, Social Work, Criminology and Gender Studies	-2.860	6.752
Sport and Exercise Science	14.821	15.432
Statistics	-14.129	7.570
Theatre and Dance, Film and Television and Multimedia	13.247	11.676
Veterinary Studies and Large Animal Science	-7.053	8.197
Visual Arts and Crafts	17.099	8.870

Year fixed effects		
First year at the tertiary education institute of the student – 1999	1.236	8.409
First year at the tertiary education institute of the student – 2007	49.183***	12.616
First year at the tertiary education institute of the student – 2008	49.823***	12.556
constant	68.121***	18.049
Number of observations	1,566	

Notes: (1) The dependent variable is the *pass rate* of the student. (2) The robust standard errors which are clustered on the *id* (*id* is composed of evaluation year, university, and subject area) level. Standard errors are adjusted for 183 clusters in *id*. (3) The omitted category variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (4) The omitted category variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. I have estimated all the coefficients by using university, subject area, and year fixed effects. (5) I am not allowed to identify specific universities due to the 5.14.2 confidentiality entity clause set by Stats NZ. (6) Significance levels are indicated by: * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$.

Table 2.F.7: Determinants of Student Pass Rates; Subsample Analysis (NCEA Missing)

	Coefficient	Robust S.E.
PBRF Outcomes		
Proportion of academics attaining PBRF rank A	-0.398	0.374
Proportion of academics attaining PBRF rank B	-0.091	0.257
Proportion of academics attaining PBRF rank C(NE)	0.489	0.369
Proportion of academics attaining PBRF rank R	-0.093	0.230
Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave	0.289	0.253
Department Level Characteristics		
Researcher's Position Title		
Proportion of Professors	0.559	0.402
Proportion of Associate Professors	0.578	0.338
Proportion of Lecturers	-0.095	.
Proportion of Other Teaching Staff	-0.719	0.513
Proportion of Other Non-Teaching Staff	0.222	.
Researcher's Gender		
Proportion of female academics	-0.073	0.167
Proportion of academics for whom gender is unknown	0.878	0.452
Researcher's Age Band		
Proportion of academics in the age band of 20 to 29	-0.164	0.753
Proportion of academics in the age band of 40 to 49	0.206	0.231
Proportion of academics in the age band of 50 to 59	0.441	.
Proportion of academics in the age band of 60 to 69	0.399	0.361
Proportion of academics in the age band of 70 and Over	1.764	1.409
Proportion of academics for whom age band is unknown	-0.717	0.417
Researcher's Ethnicity		
Proportion of Asian academics	0.058	0.244
Proportion of Māori academics	-0.044	0.246
Proportion of Pasifika academics	0.311	0.812
Proportion of Middle Eastern/Latin American/African academics	-0.974	0.963
Proportion of academics belonging to "other ethnicity"	-0.388	0.305
Proportion of academics for whom ethnicity is unknown	0.107	.
Student Level Characteristics		
Student's gender		
Female student	2.770	3.123
Student's ethnicity		
Asian student	-5.828	5.148
Māori student	-14.717***	4.513
Pasifika student	-37.306***	10.706
Middle Eastern/Latin American/African student	-8.912	17.821
Student belonging to "other ethnicity"	-14.067	8.611
Student for whom ethnicity is unknown	1.631	11.035
Student's high school decile		
School decile 1	-0.663	9.372
School decile 2	6.378	11.957
School decile 3	-3.582	7.089
School decile 4	-0.249	6.566
School decile 6	-8.443	5.340
School decile 7	-6.163	5.686

School decile 8	-6.256	6.200
School decile 9	1.514	6.611
School decile 10	-0.779	6.721
School decile missing	-20.337	11.995
University fixed effects		
University 2	22.414	20.305
University 3	6.649	12.128
University 4	10.614	13.641
University 5	7.633	13.696
University 6	-9.574	13.853
University 7	16.232	10.185
University 8	-5.558	15.594
Subject Area fixed effects		
Agriculture and Other Applied Biological Sciences	17.288	13.755
Anthropology and Archaeology	-21.872	15.243
Architecture, Design, Planning, Surveying	39.445**	13.578
Chemistry	-66.981	53.184
Clinical Medicine	136.203***	14.357
Communications, Journalism and Media Studies	36.418**	11.888
Computer Science, Information Technology, Information Sciences	11.916	10.953
Dentistry	180.469***	17.726
Design	63.319***	15.816
Earth Sciences	-8.952	31.252
Ecology, Evolution and Behaviour	9.642	14.896
Economics	59.959*	23.563
Education	31.032**	11.600
Engineering and Technology	21.992	11.570
English Language and Literature	11.160	14.713
Foreign Languages and Linguistics	15.625	11.580
History, History of Art, Classics and Curatorial Studies	4.627	13.078
Law	13.361	10.847
Management, Human Resources, Industrial Relations, International Business and Other Business	-6.214	11.130
Marketing and Tourism	2.572	10.385
Molecular, Cellular and Whole Organism Biology	16.993	14.979
Music, Literary Arts and Other Arts	-3.894	19.147
Māori Knowledge and Development	22.186	26.210
Other Health Studies (including Rehabilitation Therapies)	23.710	12.800
Philosophy	-25.060	15.479
Physics	25.729	13.960
Political Science, International Relations and Public Policy	-6.606	10.853
Psychology	16.581	13.405
Pure and Applied Mathematics	21.244	18.005
Religious Studies and Theology	-4.014	16.086
Sociology, Social Policy, Social Work, Criminology and Gender Studies	5.688	12.533
Sport and Exercise Science	49.518**	17.396
Statistics	16.893	20.769
Theatre and Dance, Film and Television and Multimedia	24.363	21.608
Veterinary Studies and Large Animal Science	93.632***	13.763
Visual Arts and Crafts	61.708**	22.799

Year fixed effects		
First year at the tertiary education institute of the student – 1999	-4.735	5.388
First year at the tertiary education institute of the student – 2007	-16.900	13.157
First year at the tertiary education institute of the student – 2008	-17.340	12.950
constant	55.607***	29.309
Number of observations	474	

Notes: (1) The dependent variable is the *pass rate* of the student. (2) The robust standard errors which are clustered on the *id* (*id* is composed of evaluation year, university, and subject area) level. Standard errors are adjusted for 190 clusters in *id*. (3) The omitted category variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (4) The omitted category variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. I have estimated all the coefficients by using university, subject area, and year fixed effects. (5) I am not allowed to identify specific universities due to the 5.14.2 confidentiality entity clause set by Stats NZ. (6) Significance levels are indicated by: * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$.

Table 2.F.8: Determinants of Student Pass Rates; Subsample Analysis (Student's Ethnicity – NZ European/Pākehā)

	Coefficient	Robust S.E.
PBRF Outcomes		
Proportion of academics attaining PBRF rank A	0.029	0.072
Proportion of academics attaining PBRF rank B	0.008	0.047
Proportion of academics attaining PBRF rank C(NE)	-0.022	0.061
Proportion of academics attaining PBRF rank R	0.076	0.069
Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave	-0.010	0.059
Department Level Characteristics		
Researcher's Position Title		
Proportion of Professors	0.065	0.062
Proportion of Associate Professors	-0.047	0.061
Proportion of Lecturers	-0.050	0.046
Proportion of Other Teaching Staff	0.013	0.100
Proportion of Other Non-Teaching Staff	0.014	0.053
Researcher's Gender		
Proportion of female academics	0.043	0.034
Proportion of academics for whom gender is unknown	0.081	0.069
Researcher's Age Band		
Proportion of academics in the age band of 20 to 29	0.058	0.144
Proportion of academics in the age band of 40 to 49	-0.046	0.040
Proportion of academics in the age band of 50 to 59	-0.097	0.051
Proportion of academics in the age band of 60 to 69	0.038	0.053
Proportion of academics in the age band of 70 and Over	-0.097	0.153
Proportion of academics for whom age band is unknown	-0.029	0.062
Researcher's Ethnicity		
Proportion of Asian academics	-0.089	0.054
Proportion of Māori academics	0.018	0.059
Proportion of Pasifika academics	0.004	0.115
Proportion of Middle Eastern/Latin American/African academics	-0.071	0.193
Proportion of academics belonging to "other ethnicity"	-0.002	0.040
Proportion of academics for whom ethnicity is unknown	-0.007	0.037
Student Level Characteristics		
Student's gender		
Female student	8.255***	0.551
Student's high school decile		
School decile 1	-4.940	1.943
School decile 2	-5.558***	1.545
School decile 3	-0.122	1.015
School decile 4	-1.082	0.918
School decile 6	0.756	0.802
School decile 7	1.339	0.809

School decile 8	1.780	0.816
School decile 9	1.351	0.773
School decile 10	2.277**	0.782
School decile missing	0.714	2.437
Level of NCEA achieved by the student		
Achieved less than NCEA level 3	-6.605***	0.766
Overseas equivalent to NCEA level 3	3.350**	1.135
Missing observations on NCEA level achieved	-10.379***	2.134
University fixed effects		
University 2	-13.298***	2.777
University 3	-10.272***	2.521
University 4	-8.590***	2.277
University 5	-19.116***	2.304
University 6	-18.957***	2.243
University 7	-6.580**	2.141
University 8	-17.476***	2.889
Subject Area fixed effects		
Agriculture and Other Applied Biological Sciences	1.732	3.044
Anthropology and Archaeology	-11.127***	2.990
Architecture, Design, Planning, Surveying	13.603***	2.343
Biomedical	5.100	4.867
Chemistry	-6.207	2.538
Clinical Medicine	38.580***	5.562
Communications, Journalism and Media Studies	-0.824	3.227
Computer Science, Information Technology, Information Sciences	-8.180***	1.914
Dentistry	22.292***	3.415
Design	18.247***	4.718
Earth Sciences	-1.394	2.982
Ecology, Evolution and Behaviour	-3.279	3.350
Economics	-0.905	1.604
Education	3.965	2.493
Engineering and Technology	4.131	3.329
English Language and Literature	-6.401**	2.251
Foreign Languages and Linguistics	2.066	2.426
History, History of Art, Classics and Curatorial Studies	-6.969***	2.095
Human Geography	-2.304	2.926
Law	7.031**	2.611
Management, Human Resources, Industrial Relations, International Business and Other Business	-6.335**	2.101
Marketing and Tourism	-2.177	1.450
Molecular, Cellular and Whole Organism Biology	-6.060	2.914
Music, Literary Arts and Other Arts	2.392	4.176
Māori Knowledge and Development	-7.114	5.762
Other Health Studies (including Rehabilitation Therapies)	7.260	2.893

Philosophy	-13.486***	2.637
Physics	-4.075	3.642
Political Science, International Relations and Public Policy	-4.062	2.779
Psychology	-4.722	2.771
Public Health	-6.893	6.381
Pure and Applied Mathematics	-9.431***	2.849
Religious Studies and Theology	-11.735***	3.086
Sociology, Social Policy, Social Work, Criminology and Gender Studies	-8.512***	2.493
Sport and Exercise Science	-0.343*	2.347
Statistics	-13.073***	3.398
Theatre and Dance, Film and Television and Multimedia	0.937*	3.602
Veterinary Studies and Large Animal Science	5.966*	4.316
Visual Arts and Crafts	13.445***	3.086
Year fixed effects		
First year at the tertiary education institute of the student – 1999	2.146	1.164
First year at the tertiary education institute of the student – 2007	0.934	2.423
First year at the tertiary education institute of the student – 2008	1.027	2.399
constant	113.465***	5.196
Number of observations	26,880	

Notes: (1) The dependent variable is the *pass rate* of the student. (2) The robust standard errors which are clustered on the *id* (*id* is composed of evaluation year, university, and subject area) level. Standard errors are adjusted for 521 clusters in *id*. (3) The omitted category variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (4) The omitted category variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. I have estimated all the coefficients by using university, subject area, and year fixed effects. (5) I am not allowed to identify specific universities due to the 5.14.2 confidentiality entity clause set by Stats NZ. (6) Significance levels are indicated by: * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$.

Table 2.F.9: Determinants of Student Pass Rates; Subsample Analysis (Student's Ethnicity – Asian)

	Coefficient	Robust S.E.
PBRF Outcomes		
Proportion of academics attaining PBRF rank A	0.015	0.108
Proportion of academics attaining PBRF rank B	-0.059	0.067
Proportion of academics attaining PBRF rank C(NE)	-0.075	0.083
Proportion of academics attaining PBRF rank R	0.042	0.095
Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave	0.126	0.090
Department Level Characteristics		
Researcher's Position Title		
Proportion of Professors	0.082	0.109
Proportion of Associate Professors	0.123	0.097
Proportion of Lecturers	0.072	0.061
Proportion of Other Teaching Staff	0.145	0.119
Proportion of Other Non-Teaching Staff	0.079	0.076
Researcher's Gender		
Proportion of female academics	0.005	0.052
Proportion of academics for whom gender is unknown	0.037	0.136
Researcher's Age Band		
Proportion of academics in the age band of 20 to 29	-0.117	0.215
Proportion of academics in the age band of 40 to 49	-0.113	0.068
Proportion of academics in the age band of 50 to 59	-0.185**	0.069
Proportion of academics in the age band of 60 to 69	-0.076	0.089
Proportion of academics in the age band of 70 and Over	-0.315	0.244
Proportion of academics for whom age band is unknown	-0.039	0.117
Researcher's Ethnicity		
Proportion of Asian academics	-0.119	0.076
Proportion of Māori academics	0.026	0.131
Proportion of Pasifika academics	0.820**	0.277
Proportion of Middle Eastern/Latin American/African academics	-0.144	0.347
Proportion of academics belonging to "other ethnicity"	0.035	0.075
Proportion of academics for whom ethnicity is unknown	-0.070	0.066
Student Level Characteristics		
Student's gender		
Female student	4.332***	0.801
Student's high school decile		
School decile 1	-4.978	3.596
School decile 2	-2.458	2.095
School decile 3	-3.184	1.900
School decile 4	-2.084	1.707
School decile 6	-1.466	1.884
School decile 7	-2.609	1.707

School decile 8	0.608	1.604
School decile 9	-0.147	1.512
School decile 10	0.687	1.785
School decile missing	-2.698	4.780
Level of NCEA achieved by the student		
Achieved less than NCEA level 3	-5.118***	1.126
Overseas equivalent to NCEA level 3	2.846*	1.327
Missing observations on NCEA level achieved	-5.862	4.348
University fixed effects		
University 2	-11.697*	5.267
University 3	-10.799***	3.335
University 4	-5.252	4.273
University 5	-13.135**	4.294
University 6	-12.503**	4.281
University 7	-2.417	3.674
University 8	-6.548	4.149
Subject Area fixed effects		
Agriculture and Other Applied Biological Sciences	0.689	3.875
Anthropology and Archaeology	-17.894**	6.567
Architecture, Design, Planning, Surveying	16.568***	3.676
Biomedical	6.271	4.134
Chemistry	-11.732*	4.597
Clinical Medicine	39.373***	4.400
Communications, Journalism and Media Studies	1.933	6.628
Computer Science, Information Technology, Information Sciences	-5.077*	2.243
Dentistry	22.240***	3.171
Design	22.092***	3.546
Earth Sciences	-4.330	3.775
Ecology, Evolution and Behaviour	-6.316	8.708
Economics	-3.140	2.433
Education	-2.463	4.743
Engineering and Technology	6.283	3.614
English Language and Literature	1.244	3.783
Foreign Languages and Linguistics	-3.198	2.638
History, History of Art, Classics and Curatorial Studies	-2.102	3.611
Human Geography	-3.631	6.331
Law	12.744***	2.895
Management, Human Resources, Industrial Relations, International Business and Other Business	-0.321	3.120
Marketing and Tourism	6.273*	2.521
Molecular, Cellular and Whole Organism Biology	3.577	4.664
Music, Literary Arts and Other Arts	11.415**	4.232
Other Health Studies (including Rehabilitation Therapies)	19.532***	4.540
Philosophy	-6.275	4.381

Physics	-0.488	4.401
Political Science, International Relations and Public Policy	-0.018	4.276
Psychology	-2.063	4.030
Public Health	-3.179	4.707
Pure and Applied Mathematics	-13.731***	2.796
Religious Studies and Theology	7.134	6.339
Sociology, Social Policy, Social Work, Criminology and Gender Studies	-3.228	3.625
Sport and Exercise Science	3.423	6.090
Statistics	-13.215***	3.202
Theatre and Dance, Film and Television and Multimedia	-4.460	6.332
Veterinary Studies and Large Animal Science	35.770***	7.319
Visual Arts and Crafts	14.794**	5.507
Year fixed effects		
First year at the tertiary education institute of the student – 1999	-0.170	2.250
First year at the tertiary education institute of the student – 2007	11.607**	4.101
First year at the tertiary education institute of the student – 2008	10.893**	4.116
constant	94.976***	8.147
Number of observations	6,267	

Notes: (1) The dependent variable is the *pass rate* of the student. (2) The robust standard errors which are clustered on the *id* (*id* is composed of evaluation year, university, and subject area) level. Standard errors are adjusted for 340 clusters in *id*. (3) The omitted category variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (4) The omitted category variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. I have estimated all the coefficients by using university, subject area, and year fixed effects. (5) I am not allowed to identify specific universities due to the 5.14.2 confidentiality entity clause set by Stats NZ. (6) Significance levels are indicated by: * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$.

Table 2.F.10: Determinants of Student Pass Rates; Subsample Analysis (Student's Ethnicity – NZ Māori)

	Coefficient	Robust S.E.
PBRF Outcomes		
Proportion of academics attaining PBRF rank A	-0.033	0.162
Proportion of academics attaining PBRF rank B	0.045	0.093
Proportion of academics attaining PBRF rank C(NE)	0.112	0.161
Proportion of academics attaining PBRF rank R	-0.124	0.118
Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave	0.033	0.115
Department Level Characteristics		
Researcher's Position Title		
Proportion of Professors	0.001	0.143
Proportion of Associate Professors	0.177	0.135
Proportion of Lecturers	0.116	0.098
Proportion of Other Teaching Staff	0.370	0.229
Proportion of Other Non-Teaching Staff	-0.085	0.118
Researcher's Gender		
Proportion of female academics	0.060	0.098
Proportion of academics for whom gender is unknown	0.006	0.159
Researcher's Age Band		
Proportion of academics in the age band of 20 to 29	-0.219	0.388
Proportion of academics in the age band of 40 to 49	0.004	0.093
Proportion of academics in the age band of 50 to 59	-0.119	0.114
Proportion of academics in the age band of 60 to 69	-0.054	0.138
Proportion of academics in the age band of 70 and Over	-0.758*	0.322
Proportion of academics for whom age band is unknown	-0.098	0.141
Researcher's Ethnicity		
Proportion of Asian academics	0.049	0.157
Proportion of Māori academics	-0.128	0.093
Proportion of Pasifika academics	-0.065	0.414
Proportion of Middle Eastern/Latin American/African academics	0.174	0.571
Proportion of academics belonging to "other ethnicity"	0.094	0.116
Proportion of academics for whom ethnicity is unknown	0.090	0.083
Student Level Characteristics		
Student's gender		
Female student	5.391***	1.668
Student's high school decile		
School decile 1	-7.388*	3.352
School decile 2	-1.087	3.470
School decile 3	-4.065	2.855
School decile 4	-1.479	3.123
School decile 6	1.462	3.157
School decile 7	-0.415	3.223
School decile 8	-0.206	3.751
School decile 9	-4.544	3.416
School decile 10	0.308	3.499
School decile missing	12.699	11.559
Level of NCEA achieved by the student		
Achieved less than NCEA level 3	-4.749*	1.920
Overseas equivalent to NCEA level 3	9.937	7.426
Missing observations on NCEA level achieved	-6.570	3.666

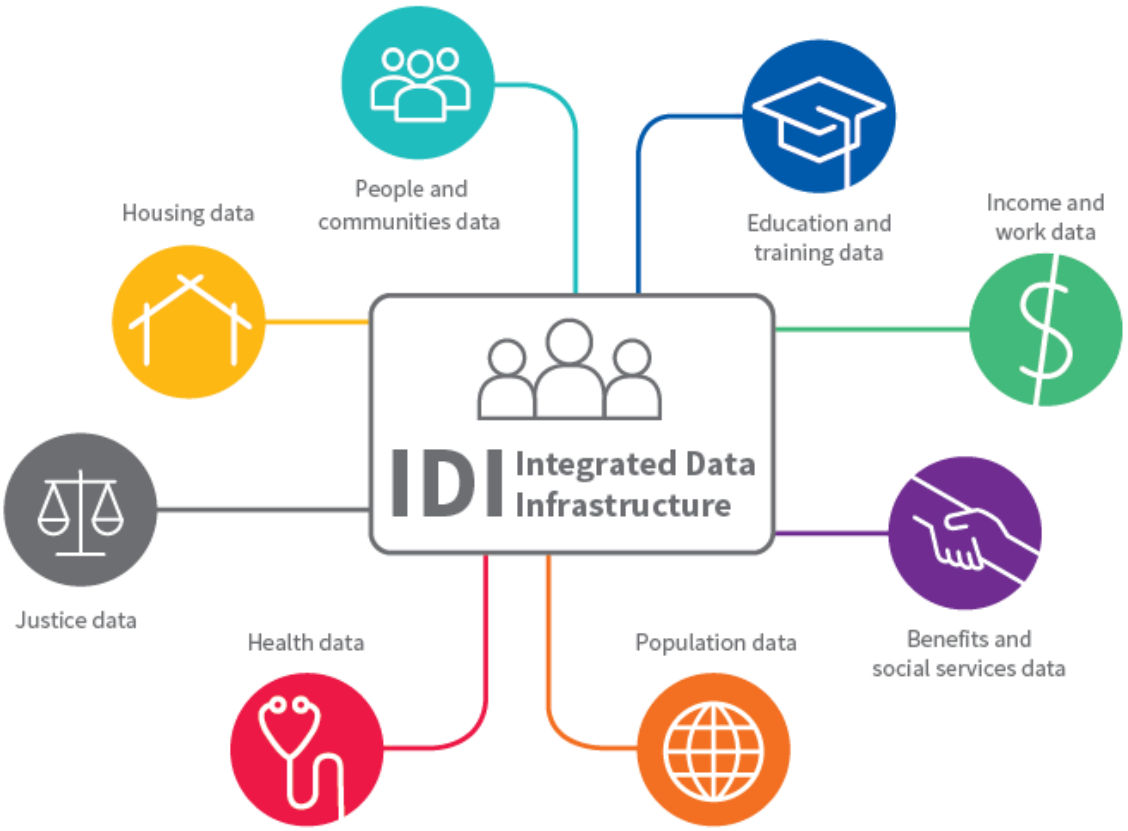
University fixed effects		
University 2	-0.857	8.726
University 3	-11.415*	5.270
University 4	-7.843	5.338
University 5	-20.665***	5.570
University 6	-24.032***	4.735
University 7	-5.329	3.540
University 8	-25.031***	4.976
Subject Area fixed effects		
Agriculture and Other Applied Biological Sciences	13.787	7.776
Anthropology and Archaeology	-7.443	6.890
Architecture, Design, Planning, Surveying	14.765*	6.142
Chemistry	-4.053	18.466
Clinical Medicine	38.811***	6.410
Communications, Journalism and Media Studies	10.141	5.630
Computer Science, Information Technology, Information Sciences	2.446	7.989
Dentistry	36.675***	9.873
Design	23.948**	7.568
Earth Sciences	5.795	9.385
Ecology, Evolution and Behaviour	13.175*	5.740
Economics	4.901	5.711
Education	19.638***	5.986
Engineering and Technology	8.633	7.707
English Language and Literature	-2.223	7.296
Foreign Languages and Linguistics	14.049	9.035
History, History of Art, Classics and Curatorial Studies	-6.589	6.761
Human Geography	13.986	13.135
Law	10.801*	5.386
Management, Human Resources, Industrial Relations, International Business and Other Business	8.657*	4.165
Marketing and Tourism	15.366***	4.679
Molecular, Cellular and Whole Organism Biology	-6.120	7.134
Music, Literary Arts and Other Arts	3.977	8.897
Māori Knowledge and Development	9.456	9.303
Other Health Studies (including Rehabilitation Therapies)	20.776***	5.819
Philosophy	-18.529	10.892
Physics	5.146	14.182
Political Science, International Relations and Public Policy	0.562	5.279
Psychology	-0.931	5.346
Public Health	23.406*	11.622
Pure and Applied Mathematics	-11.739	12.540
Religious Studies and Theology	7.331	10.518
Sociology, Social Policy, Social Work, Criminology and Gender Studies	-10.173	5.719
Sport and Exercise Science	3.794	6.184
Statistics	21.423	11.180
Theatre and Dance, Film and Television and Multimedia	3.333	12.504
Veterinary Studies and Large Animal Science	155.810***	11.751
Visual Arts and Crafts	25.405**	9.703

Year fixed effects		
First year at the tertiary education institute of the student – 1999	1.769	3.155
First year at the tertiary education institute of the student – 2007	2.623	6.241
First year at the tertiary education institute of the student – 2008	2.635	6.158
constant	87.838***	11.452
Number of observations	1,641	

Notes: (1) The dependent variable is the *pass rate* of the student. (2) The robust standard errors which are clustered on the *id* (*id* is composed of evaluation year, university, and subject area) level. Standard errors are adjusted for 321 clusters in *id*. (3) The omitted category variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (4) The omitted category variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. I have estimated all the coefficients by using university, subject area, and year fixed effects. (5) I am not allowed to identify specific universities due to the 5.14.2 confidentiality entity clause set by Stats NZ. (6) Significance levels are indicated by: * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$.

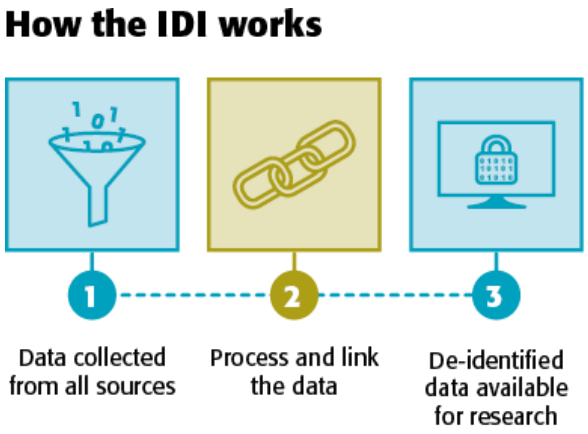
Appendix 2G: Supplementary Figures

Figure 2.G.1: IDI Data



Source: Stats NZ. *Overview of current IDI datasets.* Accessed 09 24, 2019. http://archive.stats.govt.nz/browse_for_stats/snapshots-of-nz/integrated-data-infrastructure.aspx

Figure 2.G.2: How the IDI works



Source: Stats NZ. *How the IDI and LBD work.* Accessed 09 24, 2019. http://archive.stats.govt.nz/browse_for_stats/snapshots-of-nz/integrated-data-infrastructure/idi-how-it-works.aspx.

Appendix 2H: Supplementary Graphs

Figure 2.H.1: Histogram of Number of Courses Taken by the Students

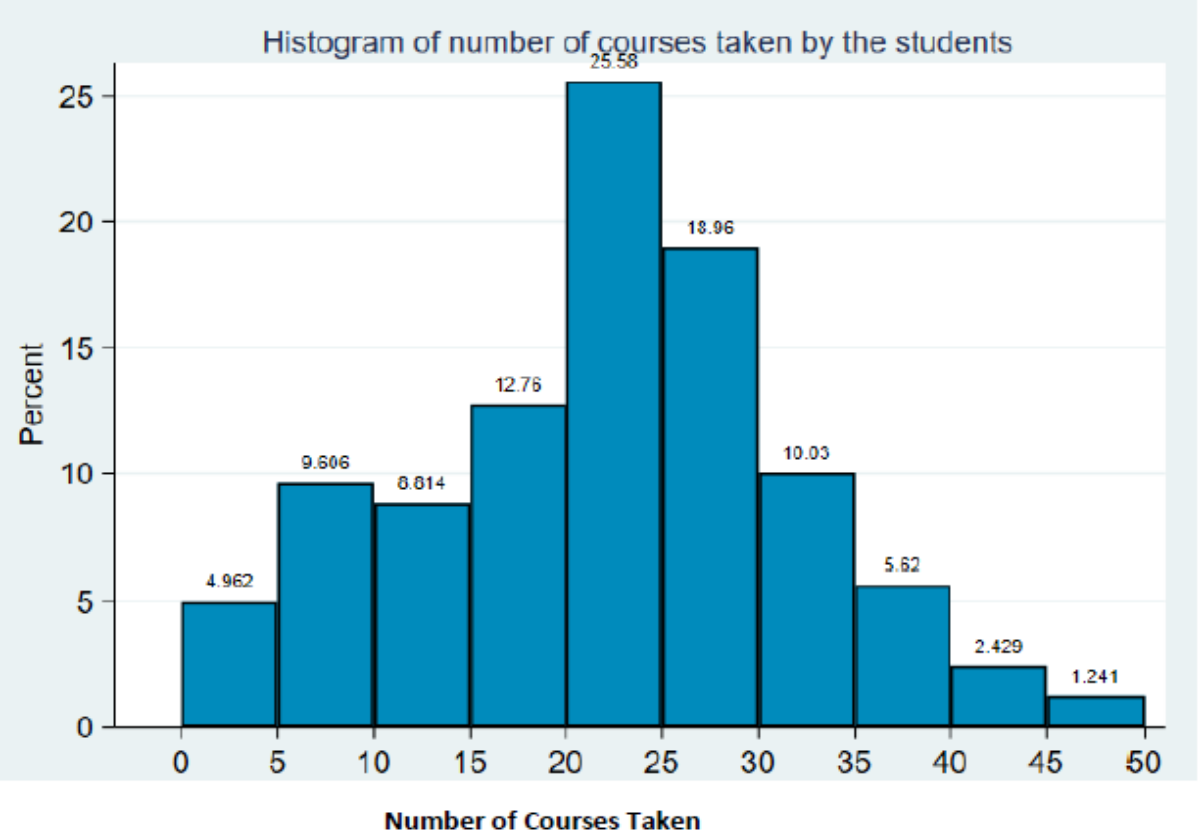
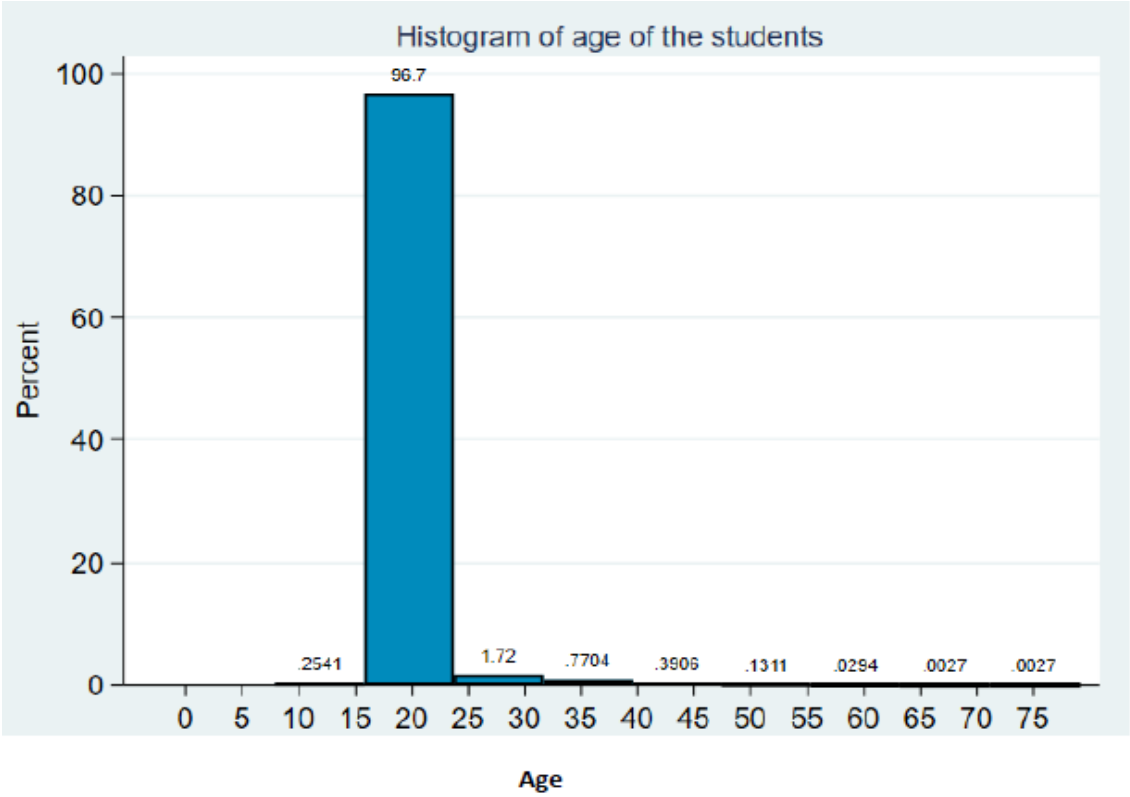


Figure 2.H.2: Histogram of Age of the Students



CHAPTER THREE

3.1 Introduction

In this chapter, I examine the link between the research-score of an academic and the scores awarded to academics in student evaluations of their teaching. In the previous chapter, I used the PBRF assessments obtained from TEC which I linked to the IDI data to test the relationship between research and student outcomes, be it via teaching or not. In this chapter, I conduct a survey of students in order to gather some evidence on the direct link between research activity and teaching quality, as evaluated by students. This work is in the spirit of Hoyt & Spangler (1976), Palali, Elk, Bolhaar, & Rud (2018), Artés, Pedraja-Chaparro, & Salinas-JiméneZ (2016). The purpose of the survey is to: (1) help place my PhD research in the context of previous literature, and (2) gain some indicative evidence of the link between research activity and a direct, even if imperfect, measure of teaching performance/quality.

I use a small-scale student evaluation survey which is similar in nature and format to the comprehensive teaching evaluation surveys that the University of Canterbury (UC) in New Zealand uses[13]. Specifically, I have designed and conducted the survey for the faculty of the Department of Economics and Finance at the University of Canterbury. I construct my survey using the Qualtrics survey platform[14]. The reason I focus on a single department is that I have manually constructed my own measure of research activity for academics. Since PBRF data is anonymised and cannot be traced back to specific academics, I collected my own research performance measures for the purposes of this supplementary analysis.

[13] I have conducted a survey for which I have obtained approval by the University of Canterbury Human Ethics Committee (please refer to Appendix 3A for the Approval Letter).

[14] The survey, as the students saw it, is available at: https://canterbury.ca1.qualtrics.com/jfe/preview/SV_aa4m4jaGVYrOGSV?Q_SurveyVersionID=current&Q_CHL=preview

After I had collected my survey data, I merged the staff-level teaching evaluation results with my constructed research activity data, and then anonymised the combined dataset. Since I did not find a significant relationship between research carried out by academics and student outcomes in the previous chapter, my survey sheds some light on one link of the chain of relationships – that between research and teaching. My results here reinforce my previous findings: I find no significant relationship between research scores of academics and the student evaluations they receive.

The rest of this chapter is organised as follows: Section 3.2 discusses the specifics of my student evaluation survey and the research score I calculated for the relevant academics. Section 3.3 explains the empirical model I use to address the question whether students evaluate more research-active academics more favourably in terms of their teaching. In Section 3.4, I discuss the major results of my chapter. Finally, Section 3.5 presents a summary and conclusions.

3.2 Survey Design

In this chapter, I study the first link in the chain of relationships described in my research design (please refer to Figure 1.2) – the (possible) link between research and teaching. In order to conduct this supplementary analysis, I proxy for teaching quality using student evaluations of lecturers in the Department of Economics and Finance, University of Canterbury. As I cannot obtain national – or even university-wide – data from student evaluations, I have restricted myself to a single department at a large New Zealand university.

I use publication records of the Department's faculty to construct my own research measure, given that the anonymised PBRF data cannot be used. In order to do this, I have followed the spirit of the system that is currently in use by the Research Committee of the College of

Business and Law at the University of Canterbury. The Research Committee currently puts a higher weight on Scimago journal ranking and uses ABDC ranking system as a supplementary source. I have reflected this in the creation of my research score. I weight the previous five years of publications (starting from 2015) of the academics in the following manner – I follow the Scimago journal ranking system which gives values Q1, Q2, Q3 and Q4 for classifying publications[15]. I assign 12 points for Q1 ranked publications, 6 points for Q2, 3 points for Q3 and 1 point for Q4 ranked publications. However, if a journal is not listed in Scimago but exists in the ABDC ranking system, which gives A*, A, B, and C values[16], I always assign 3 points. If the journal is not listed in either of the two ranking systems, I allot 1 point. Therefore, the summary measure of the research performance of UC Economics and Finance academic staff is a weighted sum of their publications. For instance, one Q1, two Q2, and three Q3 publications will result in a research score of 1x12 + 2x6 + 3x3 = 33. I rank books as "Q1" and book chapters as "Q4". I have not considered student textbooks, intermediate products such as discussion/working papers, newspaper articles, conference proceedings, supervisions, videos and so on while calculating the research score of academics. Hence, my measure is less comprehensive than a PBRF evaluation.

My pool of survey participants are all students who declared that they are undergraduate students majoring in Economics and/or Finance and/or Business Economics at the University of Canterbury. I made no exclusion on the basis of age, gender, ethnic origin, or any other criteria. I posted the survey link on the UC Learn site for Economics, Finance and Business Economics students administered by the Department of Economics and Finance as well as advertised it via UCSA (University of Canterbury Students' Association) Noticeboard Facebook page. I mentioned on the homepage of the survey that students should only participate in the survey if they are majoring in Economics, Business Economics or Finance. I have chosen them as participants in the teaching evaluation survey because contacting and recruiting students from one department is easier and provides a more homogenous measure of student experience. Also, the Department of Economics and Finance is the one I am most familiar with

[15] https://www.scimagojr.com/journalrank.php
[16] https://abdc.edu.au/research/abdc-journal-list/

given my PhD study is in Economics. In order to enhance the response rate, I distributed forty $5 gift vouchers redeemable at cafes on the university campus in the form of a prize draw.

I have used a software package called Qualtrics for conducting the survey. The participants were asked to complete a short teaching evaluation that asked them which year of university study they are in and asked them to select the faculty members who have taught them. This was followed by students being asked to complete four questions about each faculty member whom they selected. These questions all relate to the perception students have about the teaching quality of each lecturer, and how interesting they found the lecture content. It took the participants approximately 5-7 minutes to complete the survey. If the students did not submit any partially or fully completed responses they had entered, I did not record their responses. Please refer to the screenshots of the main survey and the raffle sign up in Appendix 3B.

I ensured voluntary consent of both parties involved in my survey – the faculty members and the students. My senior supervisor, Dr Philip Gunby, emailed all the faculty members of the Department of Economics and Finance to ask them whether they agreed to be included in the survey, making it clear that opting-out is a perfectly legitimate and understandable option and without any adverse consequences. The participation of the students in the survey was also completely voluntary. If students chose to take part in the survey, then I registered their consent via an online consent form. Please refer to Appendix 3C for the online consent form.

I also ensured anonymity and confidentiality of the survey responses. The survey responses are confidential because no one has access to the raw data apart from me. This is in order to assure that the students' responses will in no way affect their treatment by the teaching faculty in the Department. Therefore, even my two research supervisors – Dr Philip Gunby and Associate Professor Andrea Menclova (both faculty members in the Department of

Economics and Finance at UC) do not have access to the raw data and can only see summary statistics of the responses.

If the participants agreed to participate in the draw (which they were asked about in the last question of the main survey), they were directed to a second survey – "Raffle sign up". I created this survey using the manual raffle feature in Qualtrics. They were asked if they wanted to leave their email address in the second survey. Creating a second survey ensured that my study is completely anonymous since the prize draw was conducted via a separate link in Qualtrics, with no identifiable personal data being captured in the survey. Therefore, the identity of participants was not revealed to anyone. I deleted the file containing the contact details of participants as soon as I drew the prizes.

3.3 Data

Students answered four questions about their lecturers by selecting an option among 'strongly agree', 'agree', 'neutral', 'disagree' and 'strongly disagree'. I assigned values of 5, 4, 3, 2 and 1 for the above-mentioned options, respectively, and calculated the *mean evaluation score* for each academic which therefore lies between 1 (worst teaching score) and 5 (best teaching score). After collecting the survey responses, I merged the staff-level teaching evaluation results with research activity data and anonymize the combined dataset.

As shown in Table 3.1, out of 185 total respondents who attempted the survey, I eliminated 9 who reported to be postgraduate students. Seventy-nine (approximately 45%) of students reported that they are majoring in Economics/Business Economics and thirty-three (approximately 19%) responded that they are majoring in Finance. Approximately half of the students are in their first or second year of study, while the other half form third year and above.

Mean student evaluation scores (anonymized) for the four questions in the survey, for all academics in the Department of Economics and Finance at UC are shown in Table 3.2. I report the number of each type of research publications of the academics over the past 5 years and their associated research scores in Table 3.3. Each publication is quality-weighted, as shown in Table 3.D.1 of the Appendix. The lowest research score obtained by an academic is zero for no publications over the period of interest and the highest research score is 147.

Table 3.1: Respondents' Characteristics

	Number of Respondents	Percent
Majoring Subject		
Economics/Business Economics (0)	79	44.89
Finance (1)	33	18.75
Unreported	64	36.36
Year of University Study		
First (0)	47	26.70
Second (1)	48	27.27
Third (2)	42	23.86
Fourth (3)	10	5.68
Fifth or Above (4)	6	3.41
Unreported	23	13.07

Table 3.2: Mean Student Evaluation Scores (anonymized)

ID	Question 1 Instructor's classes/sessions were well organised.	Question 2 Instructor's attitude towards me was good.	Question 3 Instructor had sound knowledge of the content	Question 4 Instructor gave topical examples.
1	4.70	4.51	4.80	4.75
	(0.58)	(0.82)	(0.44)	(0.61)
2	4.05	4.00	4.24	3.86
	(0.74)	(0.92)	(0.62)	(0.79)
3	2.67	3.33	4.33	3.33
	(0.58)	(0.58)	(0.58)	(1.53)
4	4.17	4.35	4.13	4.22
	(0.72)	(0.71)	(0.76)	(0.90)
5	4.14	4.57	4.64	4.36
	(0.66)	(0.65)	(0.84)	(0.74)
6	4.00	4.00	5.00	4.00

	--	--	--	--
7	4.32	4.28	4.48	4.00
	(0.75)	(0.74)	(0.65)	(1.00)
8	3.67	3.89	5.00	4.33
	(1.22)	(0.78)	(0.00)	(0.87)
9	4.35	4.43	4.63	4.27
	(0.78)	(0.84)	(0.73)	(0.89)
10	4.66	4.52	4.73	4.55
	(0.54)	(0.64)	(0.45)	(0.68)
11	4.91	4.95	4.91	4.77
	(0.29)	(0.21)	(0.29)	(0.43)
12	4.35	4.43	4.30	4.43
	(0.86)	(0.69)	(0.81)	(0.80)
13	4.00	3.93	4.07	3.71
	(0.88)	(0.73)	(0.83)	(0.91)
14	4.11	4.16	4.47	3.53
	(0.81)	(0.60)	(0.70)	(0.84)
15	4.35	4.47	4.59	3.88
	(0.79)	(0.80)	(0.62)	(1.11)
16	4.24	4.12	4.59	4.00
	(0.80)	(0.95)	(0.62)	(0.95)
17	2.71	3.71	3.43	3.14
	(0.95)	(0.76)	(0.79)	(0.38)
18	4.00	4.28	4.78	3.83
	(0.97)	(1.02)	(0.43)	(1.10)
19	4.04	4.37	4.26	3.61
	(1.06)	(0.79)	(0.71)	(1.20)
20	4.73	4.32	4.82	4.55
	(0.46)	(0.65)	(0.39)	(0.67)
21	5.00	4.00	5.00	5.00
	--	--	--	--
22	4.50	4.00	4.50	5.00
	(0.71)	(1.41)	(0.71)	(0.00)

Note: Mean student evaluation scores for all the academics (anonymised) of the Department of Economics and Finance at the University of Canterbury are shown in this table. The values in parentheses are standard deviations.

Table 3.3: Number of each type of publications of all Economics & Finance UC academics (anonymised)

Academic ID	Number of journal publications	Number of books	Number of book chapters	Scholarly editions/Literary translations	Total number of publications	Research score
1	10				10	74
2	4				4	18
3	11				11	93
4	8				8	58
5	10		1	5	16	90
6	6		2		8	38
7	6				6	34
8	6	1			7	45
9	1				1	12
10					0	0
11	7				7	51
12	4				4	16
13	10		4		14	79
14	5				5	18
15	20				20	147
16	0				0	0
17	1				1	6
18	8		1		9	62
19	3				3	24
20	8				8	72
21	2				2	24
22	5				5	39

3.4 Empirical Model

My analysis sample consists of undergraduate students who have studied at least one course from the faculty of the Department of Economics and Finance, University of Canterbury. The explanatory variable that I use in my empirical model is the *research score* of the academics. As mentioned before, I calculated the research scores manually, by using publicly available information on research/scholarly/creative works of UC academics provided on the University

of Canterbury research Profiler website[17]. I estimate the following empirical model separately for each aspect of teaching quality (i.e., for each question from the survey):

$$ES_n = \beta_0 + \beta_1 RS_n + \mu$$

where ES_n is the mean student evaluation score of academic *n* and RS_n is the research score of academic *n*.

3.5 Methods and Results

I estimate the model with OLS and tobit and correct standard errors for heteroskedasticity. To acknowledge the fact that *student evaluation scores* of academics are observed more precisely when based on a larger number of respondents for the particular question answered for each academic, I weigh (using *aweight* in Stata) all my analyses by the number of respondents for the particular question answered for each academic.

The scatter diagrams (Figures 3.1, 3.2, 3.3 and 3.4) and the regression results for both the models – OLS and tobit – show that the effects of research performance are statistically and economically insignificant. For instance, a 10-point increase in research score (representing, for example, the addition of one Q2 + one Q3 + one Q4 publications) is associated with a 0.01-point increase in the student evaluation score for question 1: the organisation of classes/sessions which has a mean across the Department of 4.17 (Table 3.4). In Table 3.5, I present weighted means and standard deviations of student evaluation scores and research scores. Using these, I calculate standardised regression coefficients as follows:

$$standardised\ regression\ coefficient$$

$$= regression\ coefficient\ \times \left(\frac{weighted\ standard\ deviation\ of\ research\ score}{weighted\ standard\ deviation\ of\ student\ evaluation\ score}\right).$$

[17] https://researchprofile.canterbury.ac.nz/Search.aspx

I weight the student evaluation scores and research scores on the basis of number of student responses. Therefore, one standard deviation increase in research score is associated with 0.1217 standard deviation increase in the student evaluation score for question 1: the organisation of classes/sessions by the OLS estimation method.

This is broadly consistent with Palali, Elk, Bolhaar, & Rud's (2018) study linking publication records of lecturers with course evaluations. In particular, the authors find that while the effect of research activity is positive but very small for Master students, it is negative for second and third year Bachelor students who give lower scores to teachers with more publications. In contrast, Artés, Pedraja-Chaparro, & Salinas-JiméneZ, (2016) find a positive link between teaching evaluations and the level of research activity by academics. Hoyt & Spangler's (1976) study which links research ratings by department heads and teaching outcomes ratings by the students finds that students highly rate more research active teachers in natural mathematical sciences but there is an inverse relationship in social sciences.

Figure 3.1: Scatter Diagram Showing Relationship between Research Score and Organisation of Classes/Sessions

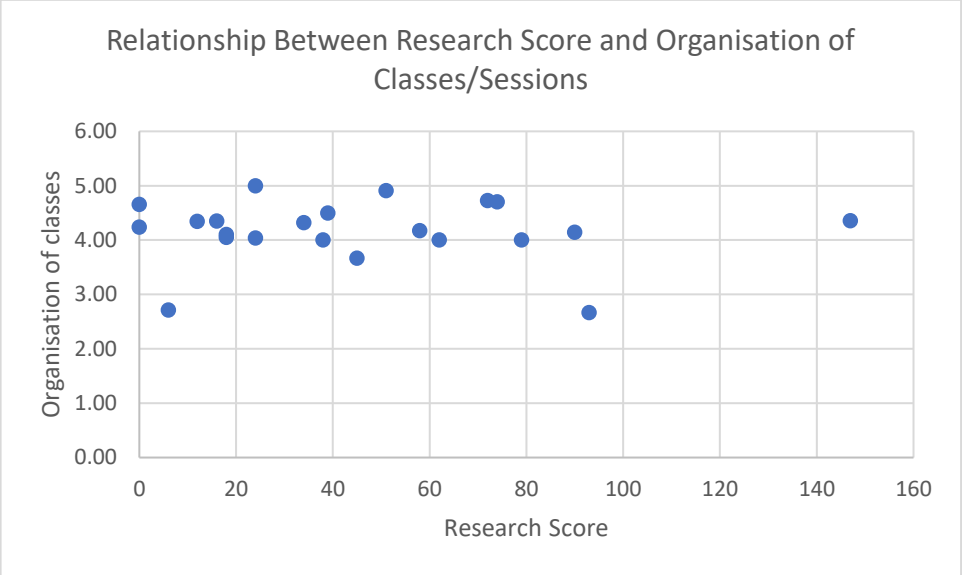


Figure 3.2: Scatter Diagram Showing Relationship between Research Score and Lecturer's Attitude

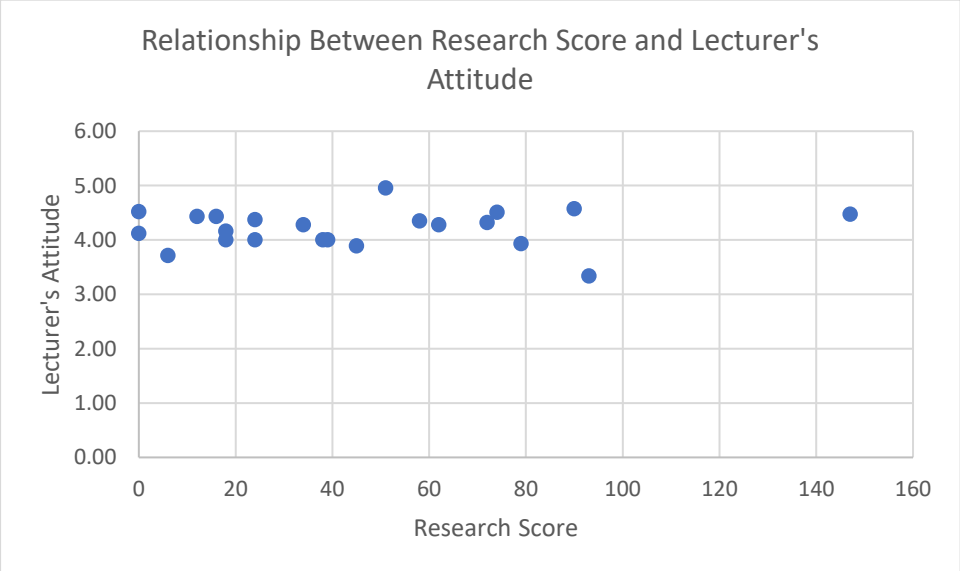


Figure 3.3: Scatter Diagram Showing Relationship between Research Score and Knowledge of Content

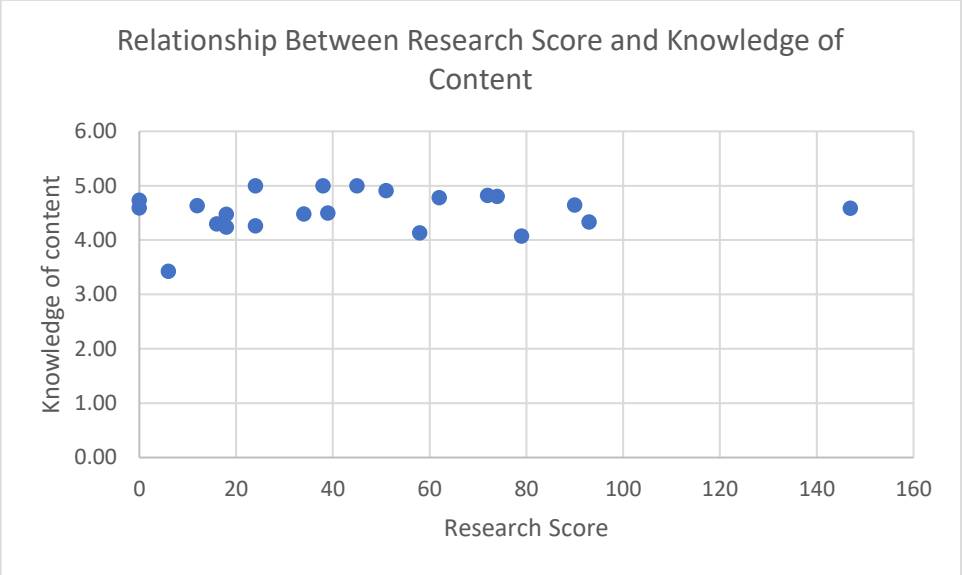


Figure 3.4: Scatter Diagram Showing Relationship between Research Score and Usage of Topical Examples in Class

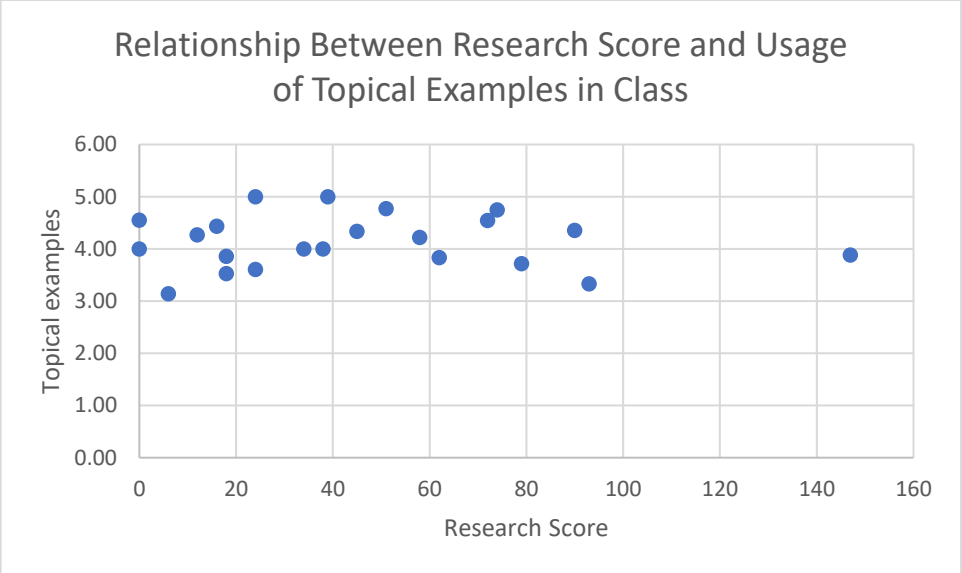


Table 3.4: Tobit and OLS Regression Results

	Tobit	OLS
Q1: Effect of research score on organisation of classes/sessions		
Research Score	0.001 (0.002)	0.001 (0.002)
Intercept	4.346*** (0.112)	4.343*** (0.115)
Q2: Effect of research score on lecturer's attitude		
Research Score	0.001 (0.001)	0.001 (0.001)
Intercept	4.338*** (0.079)	4.338*** (0.081)
Q3: Effect of research score on lecturer's knowledge of content		
Research Score	0.001 (0.001)	0.001 (0.002)
Intercept	4.556*** (0.075)	4.549*** (0.078)
Q4: Effect of research score on use of topical examples in class		
Research Score	0.002 (0.003)	0.002 (0.003)
Intercept	4.223*** (0.136)	4.216*** (0.140)

Note: The dependent variable is the *student evaluation score* of the academic. Standard errors are robust and in parentheses under the corresponding coefficient estimate. There are 22 observations. Significance levels are indicated by: * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$.

Table 3.5: Standardised Effect sizes of Relationship between Research Scores and Student Evaluation Scores

	Q1: Effect of research score on organisation of classes/sessions	**Q2: Effect of research score on lecturer's attitude**	**Q3: Effect of research score on lecturer's knowledge of content**	**Q4: Effect of research score on use of topical examples in class**
Weighted Mean Student Evaluation Scores	4.3893	4.3758	4.5965	4.2900
Weighted Standard Deviation of Student Evaluation Scores	0.3555	0.2203	0.2478	0.3849
Weighted Mean Research Scores	37.2009	37.2311	37.2009	37.1803
Weighted Standard Deviation of Research Scores	34.6349	34.6541	34.6349	34.6115
Regression Coefficients (OLS estimation method)	0.0012	0.0010	0.0013	0.0020
Standardised Regression Coefficients (OLS estimation method)	0.1217	0.1613	0.1787	0.1781

3.6 Conclusion

In my analysis so far, I have found that the research performance of academics seems to have little impact on i) students' university achievement as measured by *pass rates* in a national dataset (Chapter-2) and student evaluations of teaching quality in a specific department (Chapter-3). More research-active academics benefit a university through quality teaching and better research reputation. However, my research shows that less research-active academics do not provide lower quality teaching. This means that less research-active academics perhaps benefit universities through a greater quantity of good quality teaching. Universities could then consider some separation of teaching and research and allow for a range of contracts — some with heavier teaching and lighter research expectations, others with lighter teaching and heavier research expectations. Universities could also reassess their hiring requirements when appointing new faculty and consider recruiting academics with less research experience for positions with higher teaching loads.

Appendix 3A: Approval Letter by Human Ethics Committee

Figure 3.A.1: Approval Letter by Human Ethics Committee

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HUMAN ETHICS COMMITTEE
Secretary, Rebecca Robinson
Telephone: +64 03 369 4588, Extn 94588
Email: human-ethics@canterbury.ac.nz

Ref: HEC 2019/35/LR-PS

2 September 2019

Swati Khurana
Economics and Finance
UNIVERSITY OF CANTERBURY

Dear Swati

Thank you for submitting your low risk application to the Human Ethics Committee for the research proposal titled "The Relationship Between Research Achievement of Academics and Student Outcomes".

I am pleased to advise that this application has been reviewed and approved.

Please note that this approval is subject to the incorporation of the amendments you have provided in your email of 29th August 2019.

With best wishes for your project.

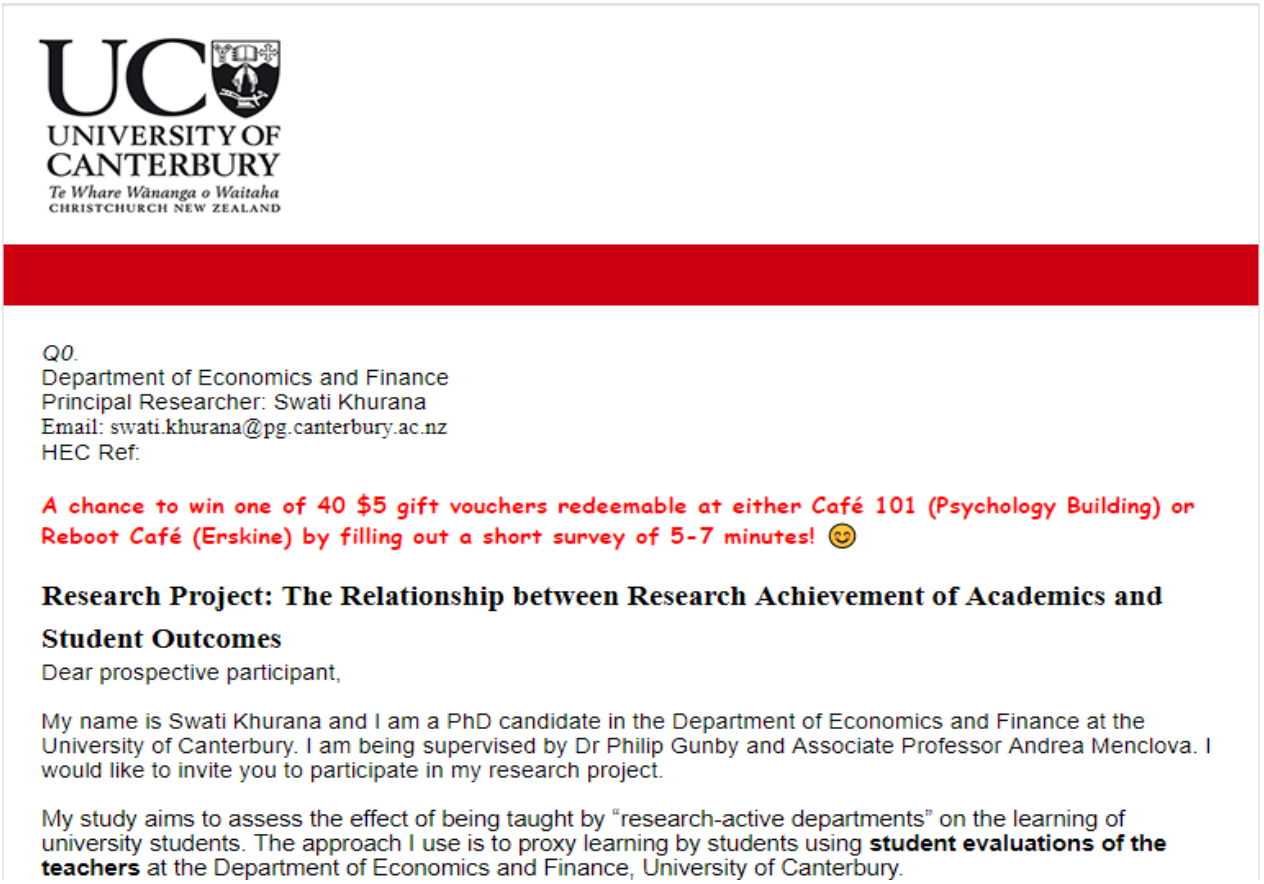
Yours sincerely

Dr Dean Sutherland
Chair, Human Ethics Committee

Appendix 3B: Screenshots of the Full Survey

The survey and information about the survey as it appeared to the students is given in the following screenshots.

Figure 3.B.1: Screenshots of the full survey



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Te Whare Wānanga o Waitaha
CHRISTCHURCH NEW ZEALAND

Q0.
Department of Economics and Finance
Principal Researcher: Swati Khurana
Email: swati.khurana@pg.canterbury.ac.nz
HEC Ref:

A chance to win one of 40 $5 gift vouchers redeemable at either Café 101 (Psychology Building) or Reboot Café (Erskine) by filling out a short survey of 5-7 minutes! 😊

Research Project: The Relationship between Research Achievement of Academics and Student Outcomes

Dear prospective participant,

My name is Swati Khurana and I am a PhD candidate in the Department of Economics and Finance at the University of Canterbury. I am being supervised by Dr Philip Gunby and Associate Professor Andrea Menclova. I would like to invite you to participate in my research project.

My study aims to assess the effect of being taught by "research-active departments" on the learning of university students. The approach I use is to proxy learning by students using **student evaluations of the teachers** at the Department of Economics and Finance, University of Canterbury.

I would like to invite you to participate in this survey if you are an **ECON/FINC/Business Economics major student** and have taken at least one of the courses taught by the faculty at the Department of Economics and Finance, University of Canterbury.

If you decide to participate in the survey, your participation will include a short teaching evaluation which will take approximately **5-7 minutes** to complete. Any information you give in this survey is completely **voluntary and confidential**, and the identity of participants will not be revealed to anyone, not even my research supervisors and **will in no way affect your treatment by the teaching faculty in the Department.** Moreover, you have a right to withdraw at any stage of the survey.

We appreciate your time and effort filling in the survey. In recognition of our appreciation, students who complete the survey will go into a draw to win **40 X $5 gift vouchers** redeemable at either Café 101 (Psychology Building) or Reboot Café (Erskine). If you wish to participate in the prize draw and provide your email address, I ensure you that there will be a separate file with contact details for a prize draw which will not be linked with the study data. The file containing the contact details of the participants will be destroyed as soon as prizes are drawn.

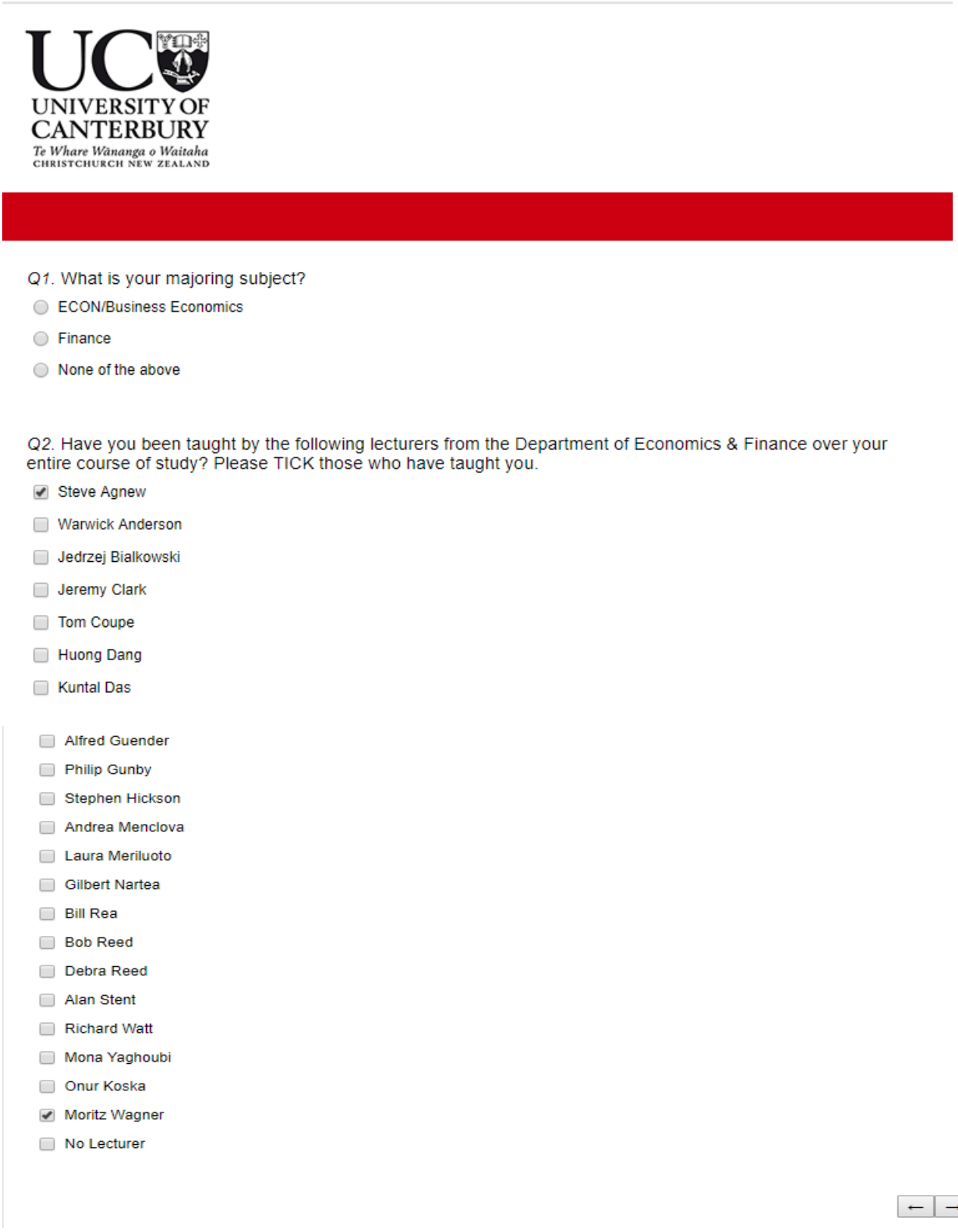
If you have any concerns about your participation in this survey, please feel free to contact me, **Swati Khurana**, PhD student at the Department of Economics and Finance, University of Canterbury, New Zealand, at swati.khurana@pg.canterbury.ac.nz or my supervisor **Dr Philip Gunby** at philip.gunby@canterbury.ac.nz.

This project has been reviewed and approved by the University of Canterbury Human Ethics Committee and participants should address any complaints to The Chair, Human Ethics Committee, University of Canterbury, Private Bag 4800, Christchurch (human-ethics@canterbury.ac.nz).

If you agree to participate in the study, you are asked to submit your survey electronically by clicking the submit button below. By completing this survey, you are giving **informed consent** for the use of your responses in the study.

Thank you very much for your time and efforts to participate in this survey.
Swati Khurana

Submit



If the students selected, let's say, Steve Agnew and Moritz Wagner, then the following questions popped up.

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Q3. Steve Agnew's classes/sessions were well organised.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

Q4. Steve Agnew's attitude towards me was good.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

Q5. Steve Agnew had sound knowledge of the content.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

Q6. Steve Agnew gave topical examples.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

← →

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Q3. Moritz Wagner's classes/sessions were well organised.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

Q4. Moritz Wagner's attitude towards me was good.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

Q5. Moritz Wagner had sound knowledge of the content.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

Q6. Moritz Wagner gave topical examples.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

← →

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Q7. Which year of University study are you in?

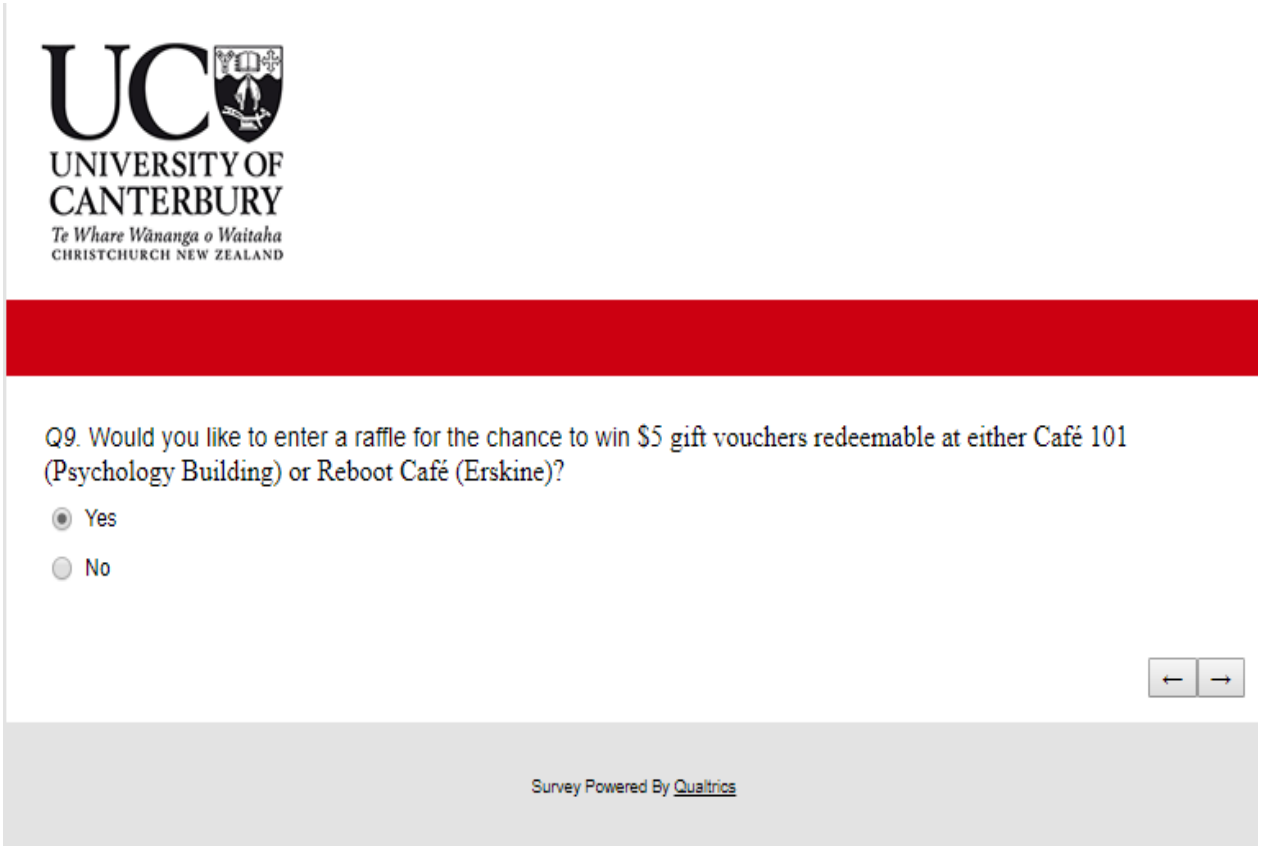
- First
- Second
- Third
- Fourth
- Fifth or above

Q8. Are you an undergrad or postgraduate student?

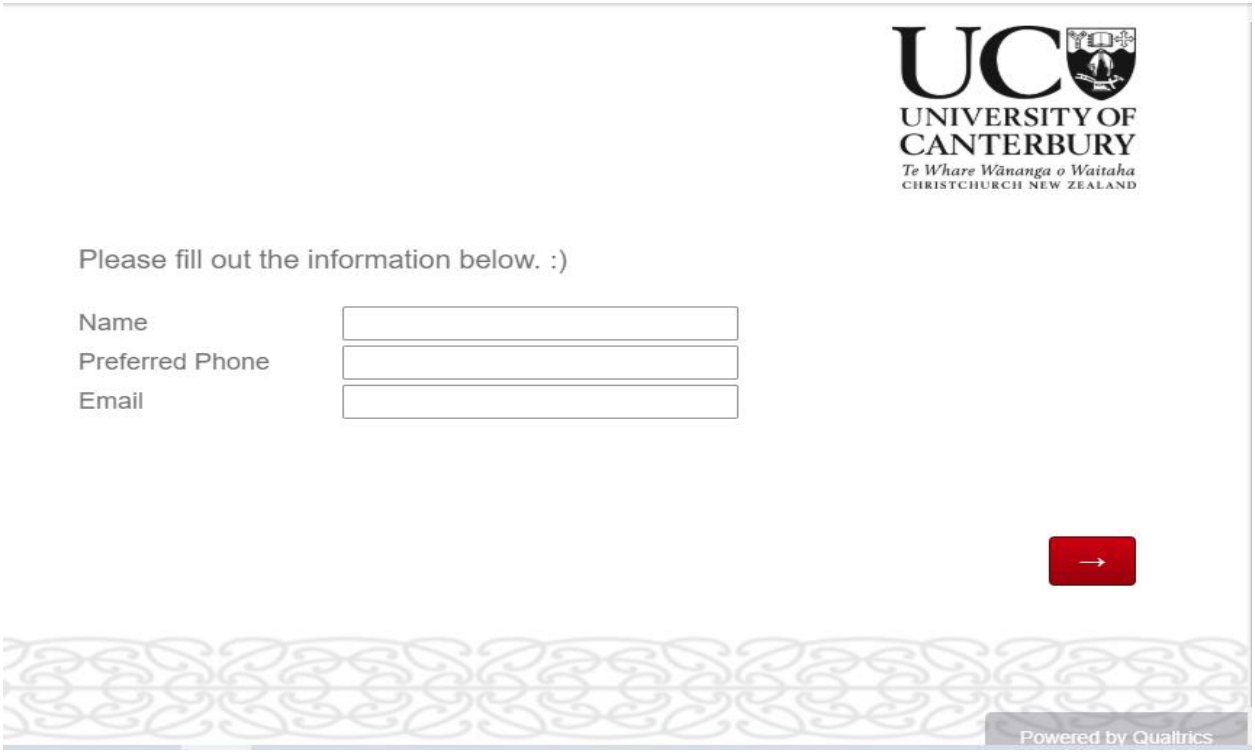
- Undergraduate
- Postgraduate

← →

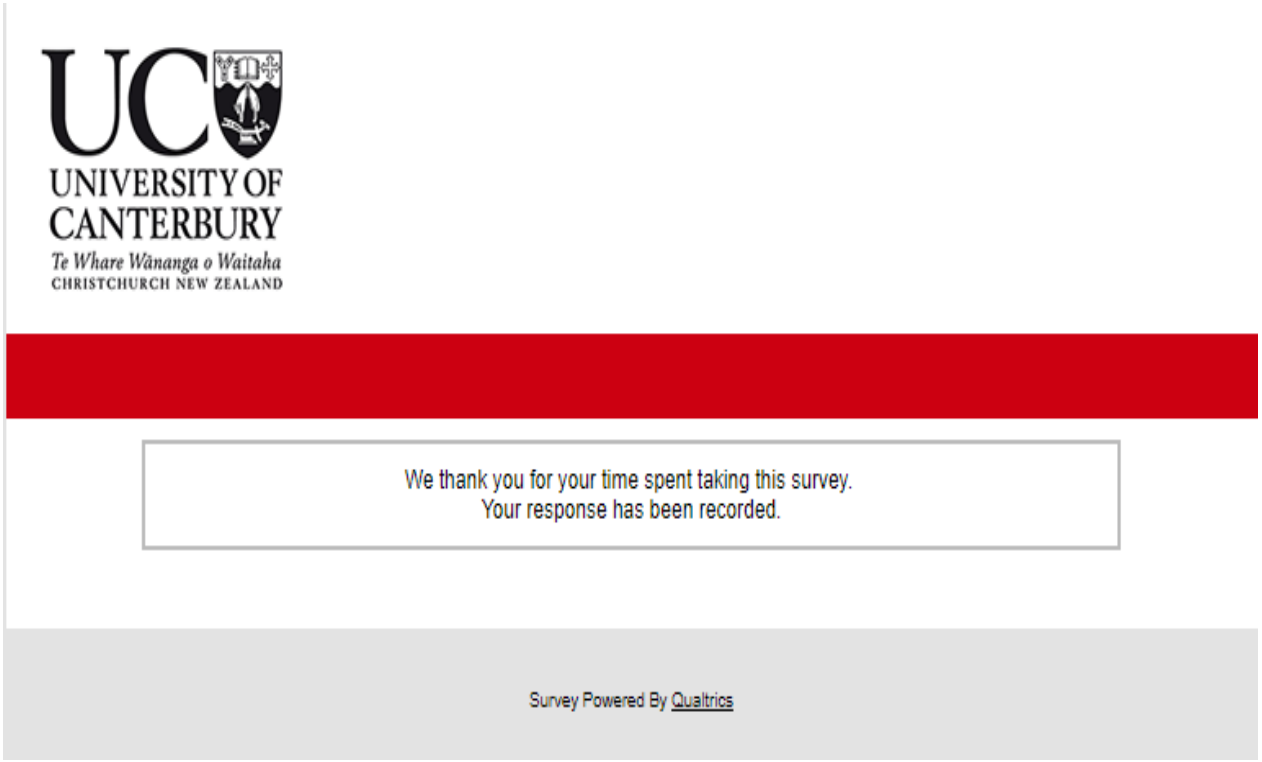
Option 1: If the participants agreed to enter the raffle:



On selecting "yes", they were redirected to the second survey- "Raffle sign up"



On selecting “no”, they saw the following message:



Appendix 3C: Online Consent Form

Figure 3.C.1: Consent Form

Department of Economics and Finance
Principal Researcher: Swati Khurana
Email: swati.khurana@pg.canterbury.ac.nz
HEC Ref:

Research Project: The Relationship between Research Achievement of Academics and Student Outcomes

Online Consent Form

Please read the following statements and tick the box if you agree with the statement:

- ☐ I have been given a full explanation of this project and have had the opportunity to ask questions.
- ☐ I understand what is required of me if I agree to take part in the research.
- ☐ I understand that participation is voluntary and I may withdraw at any time without penalty. Withdrawal of participation will also include the withdrawal of any information I have provided should this remain practically achievable.
- ☐ I understand that any information or opinions I provide will be kept confidential to the researcher and that any published or reported results will not identify the participants. I understand that a thesis is a public document and will be available through the UC Library.
- ☐ I understand that all data collected for the study will be kept in locked and secure facilities and/or in password protected electronic form and will be destroyed after 10 years.
- ☐ I understand the risks associated with taking part and how they will be managed.
- ☐ I understand that I can contact the researcher Swati Khurana (swati.khurana@pg.canterbury.ac.nz) or supervisor Dr Philip Gunby (philip.gunby@canterbury.ac.nz) for further information. If I have any complaints, I can contact the Chair of the University of Canterbury Human Ethics Committee, Private Bag 4800, Christchurch (human-ethics@canterbury.ac.nz)
- ☐ I understand that I can receive a report on the results of the study by contacting the researcher at the end of the project.

By providing your name and email address below and clicking the submit button, I agree to participate in this research project.

Name:_____ Signed:_____ Date:_____

Email address *(for report of findings)*:_____

SUBMIT

Appendix 3D: Calculation of Research Score

Table 3.D.1: Calculation of Research Score

S.No.	Year	Serial number of publications	Journal name	SCImago journal rank	Score	Total score
1	2015	1	Journal of Economic Psychology	Q1	12	
	2015	2	Journal of Retailing and Consumer Services	Q1	12	
	2015	3	Journal of Financial Management, Markets and Institutions	Q4	1	
	2015	4	International Journal of Consumer Studies	Q2	6	
	2015	5	New Zealand Economic Papers	Q2	6	74
	2016	6	Higher Education Quarterly	Q1	12	
	2016	7	The International Journal of Management Education	Q2	6	
	2017	8	Business and Economic Research	Q4	1	
	2018	9	International Journal of Consumer Studies	Q2	6	
	2018	10	Young Consumers	Q1	12	
2	2015	1	Pacific Accounting Review	Q2	6	
	2018	2	Accounting and Finance	Q2	6	18
	2019	3	Accounting Research Journal	Q3	3	
	2019	4	Managerial Finance	Q3	3	
3	2015	1	Applied Finance Letters	Q3	3	
	2015	2	International Review of Financial Analysis	Q1	12	93

	2016	3	Journal of Futures Markets	Q1	12	
	2016	4	The Journal of Derivatives	Q2	6	
	2017	5	The Journal of European Economic History	Q3	3	
	2018	6	Journal of Futures Markets	Q1	12	
	2019	7	International Review of Financial Analysis	Q1	12	
	2019	8	Journal of Wealth Management	Q3	3	
	2019	9	International Review of Financial Analysis	Q1	12	
	2019	10	Economics Letters	Q2	6	
	2020	11	IISE Transactions	Q1	12	
4	2015	1	Journal of Environmental Economics and Policy	Q4	1	
	2016	2	Southern Economic Journal	Q2	6	
	2017	3	New Zealand Economic Papers	Q2	6	
	2017	4	Economic Record	Q3	3	58
	2017	5	The Journal of Development Studies	Q1	12	
	2017	6	Resources Policy	Q1	12	
	2019	7	Resources Policy	Q1	12	
	2019	8	Economics: The Open-Access, Open-Assessment E-Journal	Q2	6	
5	2015	1	Book Chapter: Academic Inbreeding and Mobility in Higher Education: Global Perspectives	Q4	1	90

2015	2	Scholarly Editions/Literary Translations: Violence and political outcomes in Ukraine – Evidence from Sloviansk and Kramatorsk	Q3	3
2016	3	Education Economics	Q2	6
2016	4	Scholarly Editions/Literary Translations: Biases in Voting - The Case of the FIFA Best Player Award	Q3	3
2016	5	Journal of Comparative Economics	Q2	6
2016	6	Scholarly Editions/Literary Translations: The Impact of War on Happiness: The Case of Ukraine	Q3	3
2016	7	Journal of Economic Behavior and Organization	Q1	12
2016	8	Economic Inquiry	Q1	12
2016	9	Scholarly Editions/Literary Translations: The Impact of Terrorism on Expectations, Trust and Happiness: The Case of the November 13 Attacks in Paris, France	Q3	3

	2017	10	Scholarly Editions/Literary Translations: Adolescents' (Un)happiness in Transition	Q3	3	
	2017	11	Applied Economics Letters	Q3	3	
	2018	12	Oxford Bulletin of Economics and Statistics	Q1	12	
	2018	13	Journal of Comparative Economics	Q2	6	
	2018	14	Economics: The Open-Access, Open-Assessment E-Journal	Q2	6	
	2019	15	Empirica	Q2	6	
	2019	16	International Journal of Manpower	Q2	6	
6	2015	1	Book chapter: Handbook of Financial Econometrics and Statistics	Q4	1	
	2016	2	The Journal of Derivatives	Q2	6	
	2017	3	Managerial Finance	Q3	3	
	2018	4	Risks	Q3	3	38
	2019	5	Book Chapter: Oxford Handbook of IPOs	Q4	1	
	2019	6	Journal of Risk	Q2	6	
	2019	7	Pacific Accounting Review	Q2	6	
	2020	8	Pacific-Basin Finance Journal	Q1	12	
7	2016	1	Economic Papers: A Journal of Applied Economics and Policy	Q2	6	34
	2017	2	Review of Applied Economics	Q4	1	

	2019	3	Emerging Markets Finance and Trade	Q2	6	
	2019	4	New Zealand Economic Papers	Q2	6	
	2019	5	Critical Finance Review	Q3	3	
	2020	6	Journal of Economic Survey	Q1	12	
8	2015	1	Economics Bulletin	Q3	3	
	2016	2	Empirica	Q2	6	
	2017	3	Open Economies Review	Q2	6	
	2018	4	Journal of Macroeconomics	Q2	6	45
	2018	5	Economic Modelling	Q2	6	
	2019	6	Book: Edward Elgar Publishing	Q1	12	
	2020	7	New Zealand Economic Papers	Q2	6	
9	2017	1	World Development	Q1	12	12
10		0	No publications		0	0
11	2015	1	New Zealand Economic Papers	Q2	6	
	2016	2	American Journal of Health Economics	Q1	12	
	2016	3	Australian and New Zealand Journal of Public Health	Q2	6	51
	2016	4	New Zealand Economic Papers	Q2	6	
	2017	5	New Zealand Economic Papers	Q2	6	
	2017	6	Economic Record	Q3	3	
	2018	7	Health Economics	Q1	12	
12	2015	1	New Zealand Economic Papers	Q2	6	
	2017	2	Review of Applied Economics	Q4	1	16
	2018	3	Canterbury Law Review	Q3	3	
	2019	4	New Zealand Economic Papers	Q2	6	
13	2017	1	Journal of Banking and Finance	Q1	12	79

	2017	2	Journal of Economics and Finance	Q3	3	
	2017	3	Book Chapter: Microfinance in Asia (conclusions)	Q4	1	
	2017	4	Book Chapter: Microfinance in Asia (overview)	Q4	1	
	2017	5	Finance Research Letters	Q2	6	
	2017	6	International Review of Finance	Q2	6	
	2017	7	Pacific Basin Finance Journal	Q1	12	
	2017	8	International Review of Economics and Finance	Q1	12	
	2017	9	Book Chapter: Information Efficiency and Anomalies in Asian Equity Markets: Theories and Evidence	Q4	1	
	2018	10	Book Chapter: International Series in Operations Research and Management Science	Q4	1	
	2018	11	Applied Economics	Q2	6	
	2018	12	International Review of Finance	Q2	6	
	2018	13	Applied Economics	Q2	6	
	2019	14	Applied Economics	Q2	6	
14	2016	1	International Journal of Financial Studies	Q3	3	
	2016	2	Journal of Investment Strategies	Q3	3	18
	2017	3	International Journal of Financial Studies	Q3	3	

	2017	4	International Journal of Financial Studies	Q3	3	
	2018	5	Economics	Q2	6	
15	2015	1	Oxford Bulletin of Economics and Statistics	Q1	12	
	2015	2	Economics: The Open-Access, Open-Assessment E-Journal	Q2	6	
	2015	3	Public Finance Review	Q2	6	
	2015	4	Econ journal watch	Q3	3	
	2016	5	Economics: The Open-Access, Open-Assessment E-Journal	Q2	6	
	2016	6	Public Finance Review	Q2	6	
	2016	7	Economics letters	Q2	6	
	2016	8	Public Finance Review	Q2	6	
	2017	9	Economic Modelling	Q2	6	147
	2017	10	Economics letters	Q2	6	
	2017	11	World Development	Q1	12	
	2017	12	American Economic Review	Q1	12	
	2018	13	Australian Economic Review	Q3	3	
	2018	14	Economics: The Open-Access, Open-Assessment E-Journal	Q2	6	
	2018	15	Economics: The Open-Access, Open-Assessment E-Journal	Q2	6	
	2018	16	Health Economics	Q1	12	
	2018	17	Research Synthesis Methods	Q1	12	
	2019	18	Emerging Markets Finance and Trade	Q2	6	

	2019	19	Critical Finance Review	Q3	3	
	2020	20	Journal of Economic Surveys	Q1	12	
16		0	No publications		0	0
17	2018	1	International Journal of Mathematical Education in Science and Technology	Q2	6	6
18	2015	1	Review of Economic Research on Copyright Issues	Q3	3	
	2016	2	Insurance and Risk Management	Q4	1	
	2017	3	Book Chapter: New Palgrave Dictionary of Economics London: Palgrave Macmillan	Q4	1	
	2017	4	European Journal of Operational Research	Q1	12	62
	2017	5	Asia-Pacific Journal of Risk and Insurance	Q3	3	
	2017	6	Journal of Economics and Business	Q2	6	
	2018	7	Sport in Society	Q1	12	
	2018	8	Economic Inquiry	Q1	12	
	2019	9	International Journal of Disaster Risk Reduction	Q1	12	
19	2016	1	Studies in Economics and Finance	Q2	6	
	2016	2	Studies in Economics and Finance	Q2	6	24
	2016	3	Journal of Corporate Finance	Q1	12	
20	2015	1	Research in Economics	Q1	12	72

	2015	2	Economics: The Open-Access, Open-Assessment E-Journal	Q2	6	
	2016	3	Economics Letters	Q2	6	
	2018	4	Review of International Economics	Q1	12	
	2018	5	Journal of Economics/ Zeitschrift fÃ¼r Nationalokonomie	Q1	12	
	2019	6	Economics: The Open-Access, Open-Assessment E-Journal	Q2	6	
	2019	7	Review of World Economics	Q1	12	
	2019	8	New Medit	Q2	6	
21	2017	1	Journal of Financial Services Research	Q1	12	24
	2017	2	Emerging Markets Review	Q1	12	
22	2015	1	Journal of Financial Intermediation	Q1	12	
	2016	2	Corporate Ownership and Control	Q3	3	39
	2016	3	Abacus	Q2	6	
	2016	4	Abacus	Q2	6	
	2018	5	Economic Inquiry	Q1	12	

CHAPTER FOUR

4.1 Introduction

In the final part of my thesis, I extend my analysis to investigate the effect of being taught by research-active departments on the labour market outcomes of students. As in Chapter-2, I use the aggregated PBRF research activity data to the level of 42 subject areas at each of the eight New Zealand universities (separately for each PBRF round) to measure the research achievement of academics. I continue to restrict my analysis to the 2003 and 2012 PBRF waves. I also continue to use the proportion of academics belonging to each PBRF Quality Category – A, B, C, C(NE), R and R(NE).

In this chapter, I measure student outcomes as student labour market destinations six years after the students enrolled themselves in a Bachelors or a STAR18 programme. Following the procedure used in the Ministry of Education study of the destinations of young graduates (Park, 2014), I categorise labour market status into four categories – receiving a benefit, being in paid employment, being in further studies, and other (including being overseas)[19]. Benefit payments include Family Support Tax Credit (FSTC) received from the Ministry of Social Development (MSD). These payments are in place to support eligible families with dependent child(ren) based on their yearly income and circumstances (Ministry of Social Development, 2021). My primary source of data on student destinations and various student characteristics is the Integrated Data Infrastructure (IDI) database maintained by Stats NZ. Specifically, I use the tertiary education (course enrolment and qualification enrolment) and Inland Revenue (IR) tax datasets.

Once I have created my dataset, I use a multinomial logit model to estimate the impact of university departments' research activity on student labour market status six years after the students enrolled themselves in tertiary study. My results show that there is no systematic

[18] As mentioned before, the Secondary Tertiary Alignment Resource (STAR) programme is designed for Year 12 and 13 secondary students in New Zealand to enrol for first-year university-level courses.

[19] Please note that my categorisation is slightly different from the MOE study as I do not use overseas data to conduct my analysis. Therefore, I group the students going abroad with other residual students.

difference between more research-active and less research-active departments in terms of students' labour market outcomes.

The remainder of this chapter is structured as follows: Section 4.2 explains the background of this study. Section 4.3 gives details of the datasets (PBRF dataset by TEC and education and tax datasets accessed through IDI) used for the analysis of this chapter. Section 4.4 describes the empirical model used to address the hypothesis mentioned above. Section 4.5 explains the methodology used in this study and the major results. Section 4.6 provides various subsample analyses for robustness check. Lastly, Section 4.7 presents the summary of the findings of this chapter.

4.2 Background

In this chapter, I focus on the impact of research activity of academics on later labour market outcomes/destinations of domestic university undergraduate students six years after their enrolment in a formal Bachelors or a STAR programme course. I follow the methods employed by Park (2014), Scott (2018), Bouchard, Cheung , & Pacheco (2020), Pacheco, Li, & Cochrane (2017), Merwood, (2013), Sin, Dasgupta, & Pacheco (2018), Pacheco & Plum, (2020), Sin, Dasgupta, & Pacheco (2018), Zinovyeva (2007), Tumen, Dixon , & Crichton (2018) and Urwin & Di Pietro (2005) to select the labour market outcomes for the analysis in this study. There are two obvious implications of this work. First, knowing if this relationship exists can have important policy implications regarding the funding and structure of New Zealand universities. Second, the results can also help prospective students and their whānau when making decisions about their university studies.

I divide the outcomes/student destinations into four major categories in the sixth 'tax year' from the year they enroll themselves in formal tertiary education. I study labour market outcomes of the same sample of students as specified in Chapter-2. Columns 1 and 3 of Table

4.1 show how each first year of tertiary education enrolment is aligned to the corresponding sixth tax year[20].

Table 4.1: Alignment of Cohorts with the Sixth Tax Year

First Year of Formal Tertiary Studies	Calendar Year of Interest (Qualification Enrolment Dataset)	Tax Year of Interest (IR Data)
1998	2004	2005 (1st April 2004- 31st March 2005)
1999	2005	2006 (1st April 2005- 31st March 2006)
2007	2013	2014 (1st April 2013 - 31st March 2014)
2008	2014	2015 (1st April 2014 - 31st March 2015)

Assigning Students' Labour Market Destinations

In the sixth tax year, I categorise each student in my sample dataset into four labour market states: receiving a benefit, being in paid employment, in further studies, and other/unknown (including overseas). Although students can belong to multiple destinations simultaneously, I assign them a unique category in the following manner.

Receiving a benefit – If the income source is identified as 'benefit' in the Inland Revenue tax data at any point of time in the sixth tax year, I assign former students the 'being on benefit' category.

Paid Employment – The New Zealand Ministry of Education (Park, 2014) defines the criterion for falling into a 'paid employment' category in terms of a minimum number of months worked (four months or more in a tax year). However, I amend this criterion to be in terms of

[20] Please note that I aggregate years 1998 and 1999 to align to the 2003 PBRF wave. Similarly, I aggregate years 2007 and 2008 to map them to the 2012 PBRF wave.

earnings. This is because the Inland Revenue tax data contains information only on monthly (and total) earnings from different income sources in a tax year but does not contain information on hours worked or hourly wages. This means an individual could only be working casually or for a short duration in a month, but the monthly earnings will show a positive amount in the tax dataset. Therefore, in order to define this criterion more meaningfully, I outline it in terms of a threshold level of earnings. My criterion is as follows: I consider students who are not already classified in the benefit category and who receive any of the following sources of income: (1) wages and salaries; (2) company/director shareholder income; (3) partnership income; (4) sole trader income; (5) paid parental leave payments; (6) accident compensation; and/or (7) self-employment income (8) withholding tax deducted payments (WHP) for this category[21]. This means I exclude benefit, pension and student allowance payments from MSD, and rental incomes when calculating the total earnings of individuals. I define the cut-off limit as NZ$4,810 in 2005/2006 tax years or NZ$7,280 in 2014/2015 tax years for a student to be assigned the paid employment category. I define the minimum earnings thresholds in a way that the students are receiving at least one-third of an annual income[22] for working full-time[23] on the minimum wage in the respective tax years.

$$\text{Threshold level of earnings} = (\text{number of hours worked in a week} \times \text{number of weeks in a year} \times \text{minimum wage per hour for that tax year}) \div 3$$

For instance, if an individual works for 30 hours in the tax years 2005 and 2006, they will earn a minimum of NZ$4,810 = [30 x 52 x {(9+9.50)/2}]/3 where NZ$9 and NZ$9.50 are the minimum wage rates for the years 2005 and 2006, respectively. In order to define this threshold, I took an average of the minimum wage rates for the years 2005 and 2006 (Employment New Zealand, 2021). Similarly, for the tax years 2014 and 2015: threshold level of earnings = NZ$7,280 = [30 x 52 x {(13.75+14.25)/2}]/3 where NZ$13.75 and NZ$14.25 are the minimum wage rates for the years 2014 and 2015, respectively. Similar to the previous

[21] My approach of including these sources of income is in alignment with MOE's criterion of defining 'paid employment' category.

[22] Following MOE's study (Park, 2014), I take a minimum one-third of the earnings as they define this threshold as at least four months in a tax year.

[23] Stats NZ define working full-time for statistical purposes as working 30 hours or more per week for paid income of some form (Employment New Zealand, 2021).

threshold, I took an average of the minimum wage rates for the years 2014 and 2015 (Employment New Zealand, 2021).

Table 4.2 shows the proportions of students falling into different income thresholds for each year. While approximately 61% of individuals earned at least NZ$4,810 in the 2005/2006 cohort, the proportion of individuals earning more than NZ$7,280 is approximately 64% in the 2014/2015 cohort. This increase in the proportion of individuals earning more than the threshold level of income in the later cohort may be partly due to the dairy boom from the year 2006 onwards (Wheeler, 2014), Canterbury rebuild post-earthquake, and higher net migration flows (The Treasury, 2014). Also, apart from the increase in the minimum wage, the average weekly earnings also increased from NZ$815 in 2005 to NZ$979 in 2015 (Stats NZ, 2021).

Table 4.2: Number and Proportion of Students in Different Income Thresholds

			Totals		%	
Tax Year	**Earnings >= $4,810**	**Earnings >= $7,280**	**Earnings >= $4,810**	**Earnings >= $7,280**	**Earnings >= $4,810**	**Earnings >= $7,280**
2005	1,467	1,386				
2006	2,856	2,697	4,323	4,083	60.70	57.33
2014	9,357	9,357				
2015	10,050	10,053	19,407	19,410	64.21	64.22

Note: The different cut-off amounts for different years reflect changes in minimum wages.

Further Study – Students who are not classified as receiving a benefit or being in paid employment and who enrol themselves in formal tertiary education in the sixth tax year from the year they had enrolled in a formal Bachelors or a STAR programme, are classified as being in further study. In order to capture student destinations in a synchronised way from the qualification enrolment and IR tax datasets, I align the qualification enrolment years (in calendar years) with the tax years (please refer to Table 4.1).

Other/unknown (including overseas) – Students who do not meet the criteria for any of the above classifications, whether the IDI data does not exist for them or they went overseas, I classify as in the other/unknown category.

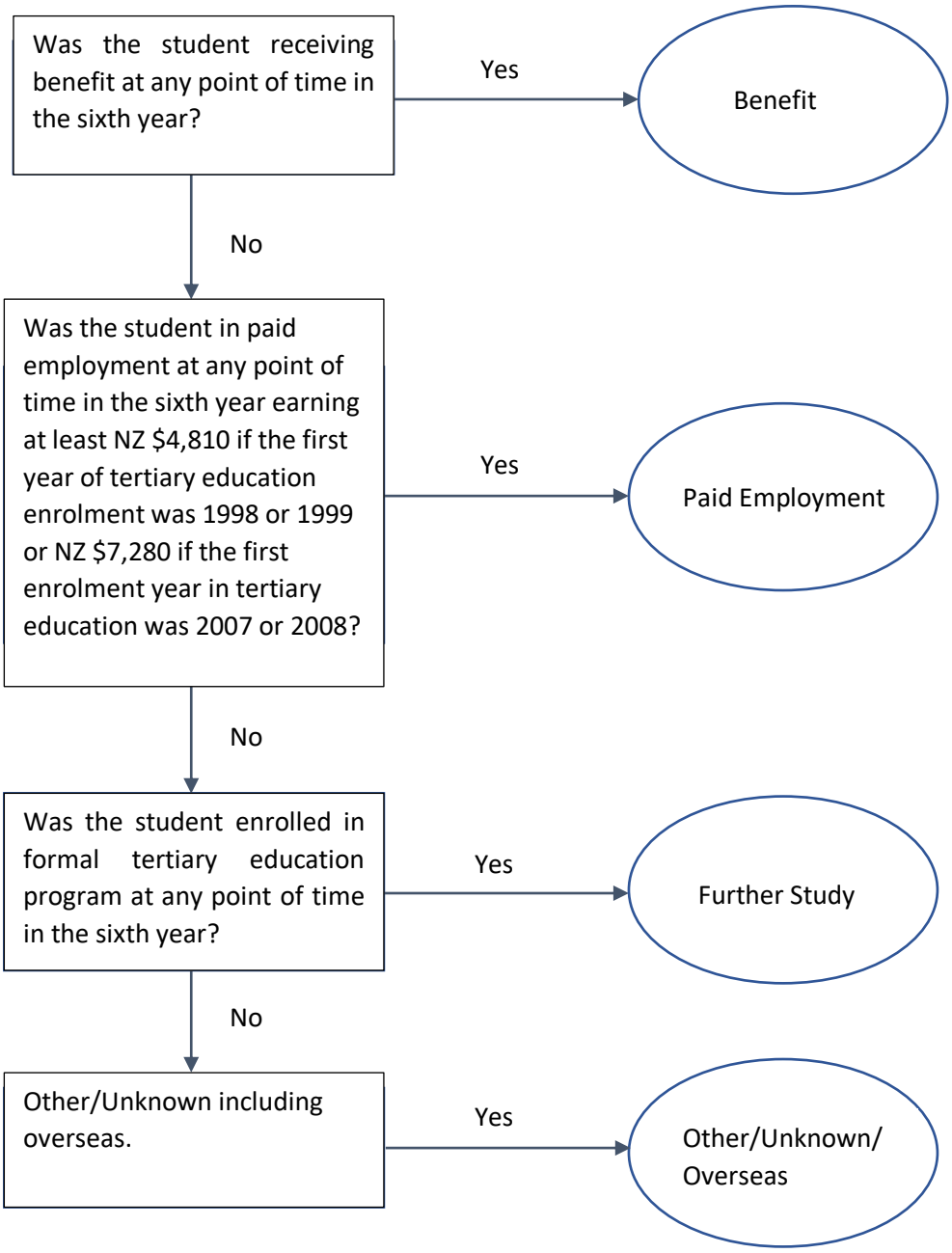
To illustrate how the categorization works, consider five hypothetical students – Alex, Yin, Mary, Kirdan and Olivia.

Scenario 1: Alex, whose first year of formal tertiary enrolment was 2008, studies for 6 months in the tax year 2015 and finishes studies in the middle of this tax year. She then starts working and during the last 6 months of 2015 earns NZ$ 30,000. Since she is not on benefit during any point of time in 2015 and earns more than NZ$ 7,280, she is classified in the 'paid employment' category.
Scenario 2: Now consider Yin whose first year of formal tertiary enrolment is 1999. Yin initially works in the tax year 2006. However, he loses his job early in the year and starts receiving a benefit. He then finds a job again later in 2006. Let us suppose that he earned NZ$ 5,000 in the earlier job and after re-employment earned NZ$ 30,000. Although the total amount of earnings for Yin in the tax year 2006 is more than NZ$ 4,810, since he was on benefit (even if shortly) during this year, he is classified in the 'benefits' category.
Scenario 3: Mary who started her first formal tertiary education in the year 2007, lives overseas in the tax year 2014 for a part of the year. She then comes back to New Zealand and remains on benefit for a couple of months while looking for work. She finds a job later in 2014 and makes NZ$ 80,000. She will also be categorized in the 'benefits' category.
Scenario 4: Kirdan, who started his first formal tertiary education in the year 2007, first studies full- time and then is self-employed later in the year, earning NZ$ 6,000 in his company in 2014. Since Kirdan is not on benefit and is earning less than NZ$ 7,280, I will classify his as in further studies.
Scenario 5: Lastly, consider Olivia whose first year of formal tertiary enrolment is 1998. She is overseas for 9 months in the year 2005, comes back to New Zealand to study full-time and also work part-time earning NZD 5,000 in the last

three months of 2005. Olivia will be classified in the paid employment category since she earned more than NZ$ 4,810.

Figure 4.1 presents a flowchart depicting how the categorization algorithm works.

Figure 4.1: Flowchart showing the algorithm to categorise students into labour market states. Students get assigned a unique status in the sixth year after they enrolled in a formal Bachelors/STAR programme.



4.3 Data

My empirical work uses data from two sources. I use PBRF research assessment of university academics from the TEC as a measure of research activities of university academics. The second source of data is from the IDI database of Stats NZ to measure students' labour market outcomes/destinations. Data from Inland Revenue is used to capture the information about being on benefit or being in paid employment for the sample of students from Chapter-2. Data from the Ministry of Education is used as a record of each student's enrolment in further education.

PBRF Research Assessments

As in Chapter-2, I use Performance-Based Research Fund (PBRF) assessments of academics/departments to measure the research achievement of academics. I continue to focus only on the Quality Evaluation component of PBRF and restrict my analysis to two PBRF waves – 2003 and 2012. As mentioned earlier in Chapter-2, each PBRF eligible staff member is assigned a Quality Category; A, B, C, or R, on the basis of the assessment of their Evidence Portfolios. Quality Category A is the highest grade and R is assigned to research inactive academics. I aggregate and use the research activity data provided by the Tertiary Education Commission on individual academics into 42 subject areas. Each subject area is a proxy for an academic department in each of the eight New Zealand universities.

Inland Revenue Tax Dataset

I use Inland Revenue tax data via the IDI database to obtain information on two labour market outcomes – being on a benefit and the total income of the individual students. The income tax year table contains information on all records in the Employer Monthly Schedule (EMS)[24], sole traders receiving self-employed income, information on rental income, company director/shareholder income and partnership income. I use the IR table organised by tax year

[24] The Employer Monthly Schedule (EMS) is filed every month by employers and contains details on gross earnings where tax is deducted at the source of the earnings (Stats NZ, 2017).

and not by calendar year because the earnings I list before, apart from the EMS, relate to the entire tax year. The raw data in this table comprises of one record per payee/payer relationship, per income source, per year, beginning with the 2000 tax year[25] (Stats NZ, 2017).

In my baseline dataset, the first formal years of tertiary study of 1998/1999 were aligned to the Quality Evaluation wave of the PBRF in 2003, and those of 2007/2008 to the 2012 PBRF wave. In my current dataset, I restricted the tax year to the sixth year from initial enrolment corresponding to each student cohort (1998, 1999, 2007 and 2008). Therefore, the corresponding tax years are 2005, 2006, 2014 and 2015, respectively. Since I study the effect of research as assessed by the two PBRF waves on student labour market outcomes/destinations, I align the tax years of 2005 and 2006 with the 2003 cohort of PBRF research assessments and the tax years 2007 and 2008 with the 2012 PBRF cohort.

Next, I obtain information on individuals who were on a benefit in any part of their sixth tax year post enrolment from tertiary study. Further, I calculate the total earnings of the individuals. Please note that there can be multiple observations for an individual in a year because individuals may work for multiple employers or may have multiple income sources. In this manner, I obtain information from the IR tax dataset for two destinations – being on a benefit and being in paid employment.

Tertiary Qualification Enrolment Dataset

I use the Ministry of Education qualification enrolment dataset accessed from the IDI to obtain information on 'further education'. This dataset records characteristics of students enrolled in tertiary education organizations (that receive government funding) in New Zealand from 1994 onwards.

[25] Please note that a tax year is defined as the period from 1st April of a given year to 31st March of the subsequent year. For instance, the tax year 2000 runs from 1st April 1999 to 31st March 2000.

For my analysis, as in Chapter-2, I restricted the dataset to formal education (excluding short courses). In order to make the sixth year for the destination 'further studies' consistent with the tax year, I converted the calendar year to the corresponding tax year for every sixth year corresponding to first year in tertiary education – 1998, 1999, 2007 and 2008. Next, I restrict the observations for which the enrolment 'tax years' are 2005, 2006, 2014 and 2015 (please refer to Table 4.1). Doing this allows me to ascertain whether an individual was enrolled in further studies six years after their first enrollment in formal tertiary education.

Merging

I merge my baseline dataset of Chapter-2 with the IR tax dataset and the qualification enrolment dataset using the Central Linking Concordance (CLC) table which contains details of unique identifiers for each dataset (please refer to Figure 4.2). Some observations were dropped in merging the datasets since I use the data from the latest IDI refresh for conducting analysis for this chapter. Merging the datasets resulted in dropping 42 students. I first merged my baseline dataset with the tax dataset to obtain two variables – 'being on a benefit' dummy variable and the total income earned in the sixth tax year. Next, I merged this dataset with the cleaned qualification enrolment dataset to obtain indicators for whether an individual was enrolled in further studies in 2005, 2006, 2014 or 2015.

My final sample for Chapter-4 consists of 37,341 individuals. Although individuals can be involved in more than one activity in a particular tax year (see Table 4.3), I assign each individual a unique labour market status as explained in Figure 4.1. Table 4.4 shows descriptive statistics related to the labour market status of students six years after their first enrollment in a Bachelors or a STAR programme. The proportion of students being in paid employment has remained at over 55% for all tax years. While there is approximately a 9-percentage point increase in the proportion of students being in paid employment, the proportion of students receiving benefit has fallen by approximately 19 percentage points from the 2004/2005 cohort to the 2013/2014 cohort. This is interesting as the seasonally adjusted unemployment rate in New Zealand has increased by approximately 1.5 percentage points from the year 2004 to 2014 (Stats NZ, 2021). Whilst the proportion of individuals in

further studies has fallen by approximately 12 percentage points, the proportion of students in the 'others' category (including those who went overseas) has almost doubled (increased by approximately 22 percentage points). This might be because of an increasing number of students going abroad (which are included in 'other' category). This possibility is consistent with data in the reports published by the Ministry of Business, Innovation and Employment (Papadopoulos, 2012) and by the Ministry of Education (Smyth & Spackman, 2012). A major conclusion in both reports was that students with a Bachelors qualification tend to go abroad straight after graduation or within a couple of years in the labour force.

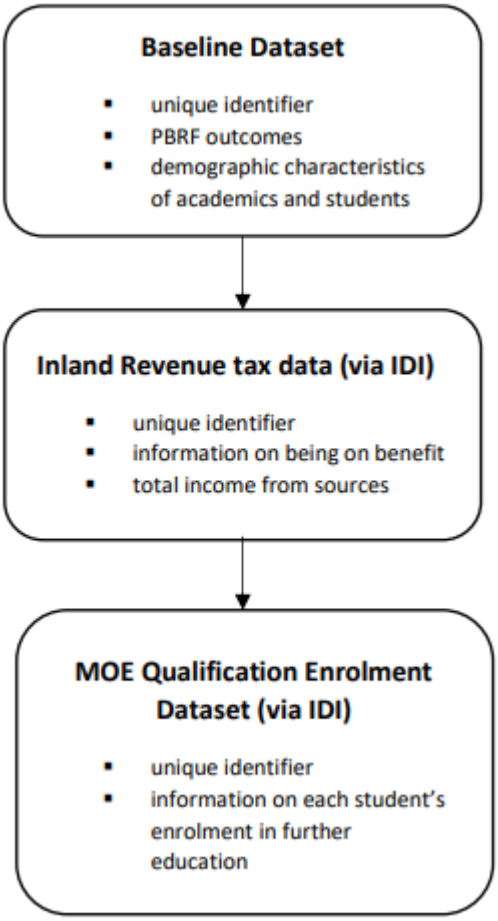
Table 4.3: Status Matrix

	Benefit	Employment	Further Study	Total
Benefit	2,655	1,632	1,542	5,829
Employment	1,632	23,730	7,494	32,856
Further Study	1,542	7,494	3,009	12,045
Total	5,829	32,856	12,045	50,730

Table 4.4: Descriptive Statistics of Students

First Year of Tertiary Education Enrolment	Corresponding Sixth Tax Year		Labour Market Status Category				
			Benefit	Employment	Further Study	Other	Total
1998	**2004**	Freq.	468	1,464	402	273	2,607
		Percent	17.95	56.16	15.42	10.47	
1999	**2005**	Freq.	531	2,856	495	630	4,512
		Percent	11.77	63.3	10.97	13.96	
2007	**2013**	Freq.	840	9,357	1,101	3,498	14,796
		Percent	5.68	63.24	7.44	23.64	
2008	**2014**	Freq.	813	10,050	1,011	3,546	15,420
		Percent	5.27	65.18	6.56	23	
		Total	2,652	23,727	3,009	7,947	37,335

Figure 4.2: Data Sources



4.4 Empirical Model and Methods

The empirical model I use to study the relationship between research activity of academics and labour market outcomes/destinations of students takes the following form:

$$L_{ijt} = f(PBRF\ outcomes_{jt},\ ranks_{jt},\ gender\ composition_{jt},\ age\ composition_{jt}, ethnicity_{jt}\ gender_i,\ age_i,\ ethnicity_i,\ high\ school\ decile_i,\ NCEA_i,\ university\ fixed\ effects, subject\ fixed\ effects, year\ fixed\ effects)$$

where L_{ijt} is the labour market status of a student *i* majoring in the subject taught by department *j* and part of cohort (time period) *t*. I categorise the *labour market status* into four mutually exclusive states – being on a benefit, paid employment, further study and

others/unknown (including overseas). In my model, the key independent variables are the aggregated *PBRF assessments*, that is, percentage of A, B, C, C(NE), R and R(NE) staff members of each academic department at each New Zealand university. The academic *ranks* are percentages of Professors, Associate Professors, Senior Lecturers, Lecturers, 'other teaching staff' and 'other non-teaching staff'. I include two variables as controls to capture the socio-economic characteristics of the students and value added by university education. One is the *decile* of the last high school attended and the second is high school (NCEA) achievement. I also include various demographic characteristics of academics and students as controls. I then use multinomial logit to estimate my empirical model, taking into account the fact that my dependent variable is categorical.

4.5 Results

Table 4.5 presents the estimated effects of PBRF research assessments of academics on student labour market outcomes using a multinomial logit model. An overall summary of my results is that I find no significant impact of research activity of academics on the labour market states of their students. That is, there is no impact on the likelihood of a student being on a benefit, in paid employment, in further studies, or in an 'other' state (including being overseas). All the coefficients are economically and statistically insignificant. For instance, the coefficient of -0.003 for 'being in paid employment' suggests that increasing the percentage of A-grade academics in a department by 10 percentage points decreases the likelihood of students being in paid employment by 0.03 percentage points. The coefficient estimates for the proportion of B, C(NE) and R grade researchers are also very close to zero with base PBRF variable, percentage of academics scoring grade C for PBRF outcomes[26]. I therefore infer that there is little to no impact of the departmental PBRF grade composition on the labour market outcomes of the students six years after they first enrol in tertiary education study. For

[26] The omitted category variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. Please note that I use these reference categories for succeeding subsample analyses.

completeness and an alternative presentation of my results, I also report odds ratios for my multinomial logit model in Appendix 4A. Please note that an odds ratio greater than 1.0 indicates a positive effect and an odds ratio lower than 1.0 a negative effect.

These results are consistent with my findings from the previous two chapters. The implication of my findings is that the negative effect of research on teaching (the trade-off of time and effort between two activities) seems to cancel out the positive effect (such as skill transfers and boost in curiosity among students) for undergraduate students at New Zealand universities.

Table 4.5: Determinants of Labour Market Outcomes; Baseline Model (Marginal Effects of Multinomial Logit)

	dy/dx	Standard Error
PBRF Outcomes		
Proportion of academics attaining PBRF rank A		
Being on Benefit	0.0000	0.0002
Paid Employment	-0.0003	0.0006
Further Study	0.0003	0.0003
Others/Unknown/Overseas	-0.0001	0.0005
Proportion of academics attaining PBRF rank B		
Being on Benefit	0.0003*	0.0001
Paid Employment	-0.0004	0.0003
Further Study	0.0002	0.0002
Others/Unknown/Overseas	-0.0001	0.0003
Proportion of academics attaining PBRF rank C(NE)		
Being on Benefit	0.0002	0.0002
Paid Employment	0.0002	0.0006
Further Study	0.0001	0.0003
Others/Unknown/Overseas	-0.0006	0.0004
Proportion of academics attaining PBRF rank R		
Being on Benefit	0.0005**	0.0002
Paid Employment	-0.0009	0.0007
Further Study	0.0009**	0.0003
Others/Unknown/Overseas	-0.0005	0.0005
Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave		
Being on Benefit	0.0000	0.0002
Paid Employment	-0.0019**	0.0006
Further Study	0.0009***	0.0002
Others/Unknown/Overseas	0.0010	0.0005

Notes: (1) The dependent variable is the *labour market status* of the student. (2) Robust standard errors are clustered on the *id* (*id* is composed of evaluation year, university, and subject area) level. Standard error adjusted for 531 clusters in id. (3) The base outcome variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (4) The base outcome variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. (5) I have estimated all the above coefficients by using university, subject area, and year fixed effects. (6) I am not allowed to identify specific universities due to 5.14.2 entity clause of Stats NZ. (7) * p < 0.05, ** p < 0.01 and *** p < 0.001.

4.6 Sub-sample Analysis

To allow for possible heterogeneity of effects, I re-estimate my baseline model for various subsamples (Table 4.6). First, I disaggregate my dataset into each of the two PBRF waves. I run these models separately for two PBRF waves (as in Chapter-2) because two potentially influential changes occurred over the sample period. One was to do with the submission of Evidence Portfolios and the other one concerned the inclusion of additional PBRF grade categories for new and emerging researchers. However, the main results are qualitatively the same for both cohorts: academics' research performance has no impact on subsequent student outcomes. Next, I stratify my sample by student gender and ethnicity. Once again, I do not find any meaningful effects of research performance on student labour market outcomes in any of these subgroups.

Table 4.6: Determinants of Labour Market Outcomes; Subsample Analysis (Marginal Effects of Multinomial Logit)

	PBRF Wave 2003	**PBRF Wave 2012**	**Male Student**	**Female Student**
PBRF Outcomes				
Proportion of academics attaining PBRF rank A				
Being on Benefit	0.0006	0.0000	0.0002	-0.0001
	(0.0008)	(0.0003)	(0.0003)	(0.0003)
Paid Employment	0.0006	0.0001	-0.0012	0.0002
	(0.0014)	(0.0006)	(0.0007)	(0.0008)
Further Study	-0.0011	0.0002	0.0007	0.0001
	(0.0009)	(0.0003)	(0.0005)	(0.0004)
Others/Unknown/Overseas	-0.0001	-0.0003	0.0003	-0.0001
	(0.0008)	(0.0005)	(0.0006)	(0.0007)

Proportion of academics attaining PBRF rank B				
Being on Benefit	0.0003	0.0002	0.0001	0.0004**
	(0.0005)	(0.0001)	(0.0002)	(0.0001)
Paid Employment	-0.0009	-0.0002	-0.0009	0.0000
	(0.0010)	(0.0004)	(0.0005)	(0.0004)
Further Study	0.0012	0.0001	0.0006	-0.0002
	(0.0007)	(0.0002)	(0.0003)	(0.0002)
Others/Unknown/Overseas	-0.0006	-0.0001	0.0002	-0.0002
	(0.0006)	(0.0003)	(0.0004)	(0.0003)
Proportion of academics attaining PBRF rank C(NE)				
Being on Benefit	n.a.	0.0004	0.0002	0.0002
	n.a.	(0.0002)	(0.0003)	(0.0002)
Paid Employment	n.a.	0.0001	-0.0005	0.0007
	n.a.	(0.0006)	(0.0008)	(0.0007)
Further Study	n.a.	0.0001	0.0005	-0.0003
	n.a.	(0.0003)	(0.0005)	(0.0005)
Others/Unknown/Overseas	n.a.	-0.0006	-0.0001	-0.0006
	n.a.	(0.0005)	(0.0006)	(0.0006)
Proportion of academics attaining PBRF rank R				
Being on Benefit	0.0005	0.0006	0.0003	0.0006**
	(0.0006)	(0.0004)	(0.0002)	(0.0002)
Paid Employment	0.0003	-0.0013	-0.0013	-0.0009
	(0.0011)	(0.0010)	(0.0009)	(0.0008)
Further Study	0.0007	0.0011*	0.0008	0.0010**
	(0.0008)	(0.0004)	(0.0005)	(0.0004)
Others/Unknown/Overseas	-0.0015*	-0.0004	0.0003	-0.0007
	(0.0007)	(0.0008)	(0.0007)	(0.0007)
Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave				
Being on Benefit	-0.0002	n.a.	-0.0001	-0.0001
	(0.0005)	n.a.	(0.0002)	(0.0002)
Paid Employment	-0.0001	n.a.	-0.0020**	-0.0016*
	(0.0010)	n.a.	(0.0008)	(0.0007)
Further Study	0.0009	n.a.	0.0003	0.0012***
	(0.0007)	n.a.	(0.0004)	(0.0003)
Others/Unknown/Overseas	-0.0006	n.a.	0.0018**	0.0005
	(0.0007)	n.a.	(0.0007)	(0.0007)

Notes: (1) The dependent variable is the *labour market status* of the student. The top values are the marginal effects of multinomial logit. (2) The bottom values in parentheses are the associated robust standard errors which are clustered on the id level. (3) Robust standard errors are clustered on the id (id is composed of evaluation year, university, and subject area) level. (4) Only coefficients on PBRF grades are reported for brevity. However, all the models control for researchers' position title, gender, age, and ethnicity. All the models also control for students' gender, age, ethnicity, high school decile and level of NCEA achieved. Please refer to the Appendix for the full table. (5) The base outcome variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (6) The base outcome variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile,

NCEA level 3 achieved for level of NCEA achieved by the student. (7) I have estimated all the above coefficients by using university, subject area, and year fixed effects. (8) I am not allowed to identify specific universities due to 5.14.2 entity clause of Stats NZ. (9) * p < 0.05, ** p < 0.01 and *** p < 0.001.

Table 4.6: Determinants of Labour Market Outcomes; Subsample Analysis (Marginal Effects of Multinomial Logit) Continued

	Student Ethnicity			
	Pakeha Student	**NZ Māori Student**	**Pasifika Student**	**Asian Student**
PBRF Outcomes				
Proportion of academics attaining PBRF rank A				
Being on Benefit	0.0001	0.0031*	-0.0035	-0.0005
	(0.0002)	(0.0016)	.	(0.0004)
Paid Employment	-0.0001	0.0008	-0.0051	0.0011
	(0.0006)	(0.0023)	.	(0.0016)
Further Study	0.0002	-0.0002	0.0028	-0.0010
	(0.0003)	(0.0010)	.	(0.0008)
Others/Unknown/Overseas	-0.0002	-0.0037**	0.0058	0.0003
	(0.0005)	(0.0013)	.	(0.0013)
Proportion of academics attaining PBRF rank B				
Being on Benefit	0.0003*	0.0010	-0.0002	0.0000
	(0.0001)	(0.0010)	.	(0.0003)
Paid Employment	-0.0003	-0.0001	-0.0034	-0.0004
	(0.0003)	(0.0013)	.	(0.0011)
Further Study	0.0001	-0.0006	0.0014	0.0006
	(0.0002)	(0.0006)	.	(0.0005)
Others/Unknown/Overseas	-0.0001	-0.0004	0.0022	-0.0003
	(0.0002)	(0.0009)	.	(0.0009)
Proportion of academics attaining PBRF rank C(NE)				
Being on Benefit	0.0002	-0.0026	0.0017	0.0001
	(0.0002)	(0.0019)	.	(0.0003)
Paid Employment	0.0004	0.0030	-0.0034	0.0000
	(0.0006)	(0.0026)	.	(0.0015)
Further Study	0.0002	-0.0010	-0.0020	0.0000
	(0.0003)	(0.0012)	.	(0.0008)
Others/Unknown/Overseas	-0.0008	0.0007	0.0037	-0.0001
	(0.0004)	(0.0016)	.	(0.0014)
Proportion of academics attaining PBRF rank R				
Being on Benefit	0.0004*	-0.0009	0.0012	0.0007*
	(0.0002)	(0.0012)	.	(0.0003)
Paid Employment	-0.0003	0.0013	-0.0067	-0.0014
	(0.0007)	(0.0020)	.	(0.0017)
Further Study	0.0008**	0.0006	0.0021	0.0007

	(0.0003)	(0.0005)	.	(0.0008)
Others/Unknown/Overseas	-0.0009	-0.0010	0.0035	0.0000
	(0.0006)	(0.0015)	.	(0.0017)
Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave				
Being on Benefit	-0.0001	-0.0005	0.0020	-0.0003
	(0.0002)	(0.0010)	.	(0.0003)
Paid Employment	-0.0010	-0.0001	-0.0051	-0.0049***
	(0.0006)	(0.0019)	.	(0.0014)
Further Study	0.0008***	-0.0007	-0.0015	0.0018**
	(0.0002)	(0.0008)	.	(0.0006)
Others/Unknown/Overseas	0.0003	0.0014	0.0047	0.0034**
	(0.0005)	(0.0014)	.	(0.0013)

Notes: (1) The dependent variable is the *labour market status* of the student. The top values are the marginal effects of multinomial logit. (2) The bottom values in parentheses are the associated robust standard errors which are clustered on the id level. (3) Robust standard errors are clustered on the id (id is composed of evaluation year, university, and subject area) level. (4) Only coefficients on PBRF grades are reported for brevity. However, all the models control for researchers' position title, gender, age, and ethnicity. All the models also control for students' gender, age, ethnicity, high school decile and level of NCEA achieved. Please refer to the Appendix for the full table. (5) The base outcome variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (6) The coefficient effect of proportion of researchers C(NE) grades is not applicable in the PBRF wave 2003 as this grade category was introduced in the later PBRF wave. Similarly, the academics did not have a choice to submit their EPs if they wanted to be assessed in the PBRF wave 2012 unlike the PBRF wave 2003. (7) The base outcome variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. (8) Please note that I was not able to estimate the standard errors for the Pasifika students because there was not enough variation in the data. However, the mean effects for the Pasifika students are not out of the main pattern of the results. (9) I have estimated all the above coefficients by using university, subject area, and year fixed effects. (10) I am not allowed to identify specific universities due to 5.14.2 entity clause of Stats NZ. (11) * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$.

4.7 Conclusion

This chapter investigated the impact of academics' research performance on undergraduate students' subsequent labour market outcomes/destinations in New Zealand. My findings suggest that whether a department is highly research active or a department does little research has no economically or statistically significant effect on the likelihood of students receiving a benefit, being in paid employment or being in further studies. This conclusion is robust to using different subsamples of my complete dataset.

A plausible reason for these results could be that more research-active academics are disproportionately involved in post-graduate teaching and supervision. Also, various counteracting mechanisms affecting the relation between research and teaching could be the cause of these findings. For instance, more research-active academics might not find enough time for individualized student interaction. The results of this chapter are in alignment with the overall findings of my previous chapters which examine the impact of research activity on students' university achievement and the student evaluation of their teachers.

Appendix 4A: Baseline Model

Table 4.A.1: Determinants of Labour Market Outcomes; Baseline Model (Marginal Effects of Multinomial Logit)

	dy/dx	Standard Error
PBRF Outcomes		
Proportion of academics attaining PBRF rank A		
Being on Benefit	0.0000	0.0002
Paid Employment	-0.0003	0.0006
Further Study	0.0003	0.0003
Others/Unknown/Overseas	-0.0001	0.0005
Proportion of academics attaining PBRF rank B		
Being on Benefit	0.0003*	0.0001
Paid Employment	-0.0004	0.0003
Further Study	0.0002	0.0002
Others/Unknown/Overseas	-0.0001	0.0003
Proportion of academics attaining PBRF rank C(NE)		
Being on Benefit	0.0002	0.0002
Paid Employment	0.0002	0.0006
Further Study	0.0001	0.0003
Others/Unknown/Overseas	-0.0006	0.0004
Proportion of academics attaining PBRF rank R		
Being on Benefit	0.0005**	0.0002
Paid Employment	-0.0009	0.0007
Further Study	0.0009**	0.0003
Others/Unknown/Overseas	-0.0005	0.0005
Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave		
Being on Benefit	0.0000	0.0002
Paid Employment	-0.0019**	0.0006
Further Study	0.0009***	0.0002
Others/Unknown/Overseas	0.0010	0.0005
Department Level Characteristics		
Researcher's Position Title		
Proportion of Professors		
Being on Benefit	0.0000	0.0002
Paid Employment	0.0006	0.0006
Further Study	-0.0006	0.0003
Others/Unknown/Overseas	0.0000	0.0005
Proportion of Associate Professors		
Being on Benefit	0.0004*	0.0002
Paid Employment	-0.0004	0.0006
Further Study	-0.0003	0.0003

Others/Unknown/Overseas	0.0003	0.0004
Proportion of Lecturers		
Being on Benefit	0.0001	0.0002
Paid Employment	0.0006	0.0004
Further Study	-0.0001	0.0002
Others/Unknown/Overseas	-0.0006	0.0003
Proportion of Other Teaching Staff		
Being on Benefit	-0.0002	0.0002
Paid Employment	0.0010	0.0007
Further Study	-0.0001	0.0003
Others/Unknown/Overseas	-0.0006	0.0006
Proportion of Other Non-Teaching Staff		
Being on Benefit	0.0001	0.0002
Paid Employment	-0.0009	0.0005
Further Study	0.0000	0.0003
Others/Unknown/Overseas	0.0008	0.0004
Researcher's Gender		
Proportion of female academics		
Being on Benefit	0.0001	0.0001
Paid Employment	-0.0006	0.0004
Further Study	0.0000	0.0002
Others/Unknown/Overseas	0.0005	0.0003
Proportion of academics for whom gender is unknown		
Being on Benefit	-0.0003	0.0002
Paid Employment	-0.0009	0.0007
Further Study	0.0006	0.0003
Others/Unknown/Overseas	0.0006	0.0006
Researcher's Age Band		
Proportion of academics in the age band of 20 to 29		
Being on Benefit	-0.0001	0.0005
Paid Employment	-0.0032*	0.0013
Further Study	-0.0002	0.0007
Others/Unknown/Overseas	0.0035**	0.0012
Proportion of academics in the age band of 40 to 49		
Being on Benefit	0.0001	0.0001
Paid Employment	0.0002	0.0004
Further Study	-0.0001	0.0002
Others/Unknown/Overseas	-0.0001	0.0004
Proportion of academics in the age band of 50 to 59		
Being on Benefit	-0.0001	0.0002
Paid Employment	0.0003	0.0005
Further Study	-0.0002	0.0003
Others/Unknown/Overseas	0.0000	0.0004

Proportion of academics in the age band of 60 to 69		
Being on Benefit	-0.0002	0.0002
Paid Employment	0.0008	0.0007
Further Study	0.0001	0.0003
Others/Unknown/Overseas	-0.0007	0.0005
Proportion of academics in the age band of 70 and Over		
Being on Benefit	0.0001	0.0005
Paid Employment	-0.0021	0.0015
Further Study	0.0016*	0.0007
Others/Unknown/Overseas	0.0003	0.0010
Proportion of academics for whom age band is unknown		
Being on Benefit	0.0004	0.0002
Paid Employment	0.0006	0.0007
Further Study	-0.0004	0.0003
Others/Unknown/Overseas	-0.0006	0.0005
Researcher's Ethnicity		
Proportion of Asian academics		
Being on Benefit	0.0000	0.0003
Paid Employment	0.0002	0.0005
Further Study	0.0004	0.0003
Others/Unknown/Overseas	-0.0005	0.0004
Proportion of Māori academics		
Being on Benefit	0.0001	0.0002
Paid Employment	-0.0016**	0.0006
Further Study	0.0003	0.0003
Others/Unknown/Overseas	0.0013**	0.0005
Proportion of Pasifika academics		
Being on Benefit	-0.0002	0.0006
Paid Employment	0.0016	0.0015
Further Study	-0.0009	0.0008
Others/Unknown/Overseas	-0.0006	0.0011
Proportion of Middle Eastern/Latin American/African academics		
Being on Benefit	0.0004	0.0009
Paid Employment	-0.0036*	0.0015
Further Study	0.0019	0.0012
Others/Unknown/Overseas	0.0012	0.0014
Proportion of academics belonging to "other ethnicity"		
Being on Benefit	0.0002	0.0002
Paid Employment	-0.0012*	0.0005
Further Study	0.0005*	0.0002
Others/Unknown/Overseas	0.0005	0.0004

Proportion of academics for whom ethnicity is unknown		
Being on Benefit	0.0000	0.0001
Paid Employment	-0.0002	0.0003
Further Study	0.0001	0.0002
Others/Unknown/Overseas	0.0001	0.0003
Student Level Characteristics		
Student's gender		
Female student		
Being on Benefit	-0.0076**	0.0025
Paid Employment	0.0094	0.0061
Further Study	-0.0230***	0.0039
Others/Unknown/Overseas	0.0211***	0.0049
Student's ethnicity		
Asian student		
Being on Benefit	-0.0017	0.0036
Paid Employment	-0.1308***	0.0112
Further Study	0.0327***	0.0065
Others/Unknown/Overseas	0.0997***	0.0090
Māori student		
Being on Benefit	0.0231***	0.0049
Paid Employment	-0.0662***	0.0145
Further Study	0.0421***	0.0078
Others/Unknown/Overseas	0.0010	0.0127
Pasifika student		
Being on Benefit	0.0319***	0.0055
Paid Employment	-0.0991***	0.0164
Further Study	0.0365***	0.0091
Others/Unknown/Overseas	0.0307*	0.0135
Middle Eastern/Latin American/African student		
Being on Benefit	0.0388***	0.0103
Paid Employment	-0.2191***	0.0292
Further Study	0.0514**	0.0156
Others/Unknown/Overseas	0.1289***	0.0199
Student belonging to "other ethnicity"		
Being on Benefit	0.0168*	0.0077
Paid Employment	-0.1038***	0.0177
Further Study	0.0149	0.0098
Others/Unknown/Overseas	0.0722***	0.0150
Student for whom ethnicity is unknown		
Being on Benefit	0.0099	0.0149
Paid Employment	-0.1037**	0.0383
Further Study	-0.0088	0.0234
Others/Unknown/Overseas	0.1026***	0.0285

Student's high school decile		
School decile 1		
Being on Benefit	0.0004	0.0088
Paid Employment	0.0516*	0.0223
Further Study	0.0042	0.0122
Others/Unknown/Overseas	-0.0561*	0.0223
School decile 2		
Being on Benefit	0.0049	0.0072
Paid Employment	-0.0049	0.0196
Further Study	0.0018	0.0110
Others/Unknown/Overseas	-0.0018	0.0172
School decile 3		
Being on Benefit	-0.0021	0.0057
Paid Employment	0.0071	0.0140
Further Study	0.0117	0.0082
Others/Unknown/Overseas	-0.0167	0.0130
School decile 4		
Being on Benefit	-0.0018	0.0066
Paid Employment	0.0178	0.0150
Further Study	-0.0013	0.0090
Others/Unknown/Overseas	-0.0146	0.0122
School decile 6		
Being on Benefit	0.0008	0.0058
Paid Employment	0.0249*	0.0124
Further Study	-0.0065	0.0074
Others/Unknown/Overseas	-0.0191	0.0124
School decile 7		
Being on Benefit	-0.0079	0.0059
Paid Employment	-0.0124	0.0124
Further Study	0.0051	0.0069
Others/Unknown/Overseas	0.0152	0.0106
School decile 8		
Being on Benefit	-0.0092	0.0059
Paid Employment	0.0119	0.0132
Further Study	-0.0035	0.0077
Others/Unknown/Overseas	0.0008	0.0115
School decile 9		
Being on Benefit	-0.0104	0.0059
Paid Employment	-0.0007	0.0129
Further Study	0.0030	0.0073
Others/Unknown/Overseas	0.0081	0.0110
School decile 10		
Being on Benefit	-0.0302***	0.0058
Paid Employment	0.0089	0.0121
Further Study	-0.0004	0.0069
Others/Unknown/Overseas	0.0217	0.0117

School decile missing		
Being on Benefit	0.0070	0.0145
Paid Employment	-0.0552	0.0321
Further Study	0.0278	0.0180
Others/Unknown/Overseas	0.0204	0.0285
Level of NCEA achieved by the student		
Achieved less than NCEA level 3		
Being on Benefit	0.0240***	0.0029
Paid Employment	-0.0542***	0.0074
Further Study	0.0226***	0.0043
Others/Unknown/Overseas	0.0076	0.0059
Overseas equivalent to NCEA level 3		
Being on Benefit	-0.0248**	0.0091
Paid Employment	-0.0109	0.0171
Further Study	-0.0041	0.0080
Others/Unknown/Overseas	0.0398***	0.0107
Missing Observations on NCEA Level Achieved		
Being on Benefit	0.0128	0.0088
Paid Employment	-0.0766**	0.0245
Further Study	0.0275*	0.0116
Others/Unknown/Overseas	0.0363	0.0208
University fixed effects		
University 1	(base outcome)	
University 2		
Being on Benefit	-0.0323**	0.0106
Paid Employment	0.0627*	0.0311
Further Study	-0.041*	0.0166
Others/Unknown/Overseas	0.0105	0.0193
University 3		
Being on Benefit	-0.0072	0.0098
Paid Employment	0.0138	0.0231
Further Study	-0.0125	0.0111
Others/Unknown/Overseas	0.0059	0.0157
University 4		
Being on Benefit	-0.0173	0.0093
Paid Employment	0.0321	0.0266
Further Study	-0.025*	0.0097
Others/Unknown/Overseas	0.0102	0.0176
University 5		
Being on Benefit	-0.0137	0.0089
Paid Employment	0.0016	0.0259
Further Study	-0.0161	0.0109
Others/Unknown/Overseas	0.0282	0.0172
University 6		

Being on Benefit	0.0106	0.0101
Paid Employment	-0.0398	0.0266
Further Study	-0.0083	0.0107
Others/Unknown/Overseas	0.0375*	0.0182
University 7		
Being on Benefit	0.0064	0.0092
Paid Employment	-0.0261	0.0261
Further Study	-0.0100	0.0110
Others/Unknown/Overseas	0.0297	0.0173
University 8		
Being on Benefit	-0.0149	0.0099
Paid Employment	-0.0125	0.0283
Further Study	-0.0209	0.0132
Others/Unknown/Overseas	0.0483*	0.0235
Subject area fixed effects		
Accounting and Finance	(base outcome)	
Agriculture and Other Applied Biological Sciences		
Being on Benefit	0.0192	0.0124
Paid Employment	-0.0369	0.0304
Further Study	0.0572**	0.0173
Others/Unknown/Overseas	-0.0395	0.0209
Anthropology and Archaeology		
Being on Benefit	0.0633**	0.0223
Paid Employment	-0.1402***	0.0399
Further Study	0.0713**	0.0209
Others/Unknown/Overseas	0.0056	0.0326
Architecture, Design, Planning, Surveying		
Being on Benefit	0.0268**	0.0097
Paid Employment	-0.1014***	0.0257
Further Study	0.0249*	0.0115
Others/Unknown/Overseas	0.0497*	0.0229
Biomedical		
Being on Benefit	-0.0008	0.0150
Paid Employment	0.0190	0.0638
Further Study	0.0690*	0.0273
Others/Unknown/Overseas	-0.0871	0.0594
Chemistry		
Being on Benefit	0.0312*	0.0125
Paid Employment	-0.1601***	0.0439
Further Study	0.1678***	0.0429
Others/Unknown/Overseas	-0.0389	0.0233

Clinical Medicine		
Being on Benefit	-0.0237***	0.0055
Paid Employment	0.1404***	0.0328
Further Study	0.0480*	0.0196
Others/Unknown/Overseas	-0.1646***	0.0165
Communications, Journalism and Media Studies		
Being on Benefit	0.0203	0.0122
Paid Employment	-0.0824**	0.0278
Further Study	-0.0077	0.0104
Others/Unknown/Overseas	0.0698**	0.0240
Computer Science, Information Technology, Information Sciences		
Being on Benefit	0.0177*	0.0085
Paid Employment	-0.0232	0.0261
Further Study	0.0255*	0.0110
Others/Unknown/Overseas	-0.0200	0.0218
Dentistry		
Being on Benefit	0.0412***	0.0106
Paid Employment	0.0035	0.0316
Further Study	-0.0071	0.0090
Others/Unknown/Overseas	-0.0376	0.0288
Design		
Being on Benefit	0.0256*	0.0124
Paid Employment	-0.1457***	0.0337
Further Study	-0.0027	0.0117
Others/Unknown/Overseas	0.1228***	0.0296
Earth Sciences		
Being on Benefit	0.0234*	0.0110
Paid Employment	-0.1403***	0.0251
Further Study	0.0489**	0.0175
Others/Unknown/Overseas	0.0679**	0.0230
Ecology, Evolution and Behaviour		
Being on Benefit	0.0513***	0.0136
Paid Employment	-0.0966**	0.0291
Further Study	0.0668***	0.0182
Others/Unknown/Overseas	-0.0215	0.0216
Economics		
Being on Benefit	0.0027	0.0069
Paid Employment	-0.1063***	0.0225
Further Study	0.0210*	0.0104
Others/Unknown/Overseas	0.0826***	0.0191
Education		
Being on Benefit	0.0404***	0.0104
Paid Employment	0.0025	0.0272
Further Study	0.0152	0.0109
Others/Unknown/Overseas	-0.0581**	0.0173

Engineering and Technology		
Being on Benefit	0.0066	0.0113
Paid Employment	-0.0575	0.0329
Further Study	0.0130	0.0147
Others/Unknown/Overseas	0.0378	0.0330
English Language and Literature		
Being on Benefit	0.0600***	0.0126
Paid Employment	-0.1243***	0.0265
Further Study	0.0643***	0.0173
Others/Unknown/Overseas	-0.0001	0.0206
Foreign Languages and Linguistics		
Being on Benefit	0.0229	0.0118
Paid Employment	-0.1918***	0.0261
Further Study	0.0772***	0.0117
Others/Unknown/Overseas	0.0917***	0.0199
History, History of Art, Classics and Curatorial Studies		
Being on Benefit	0.0537***	0.0108
Paid Employment	-0.1140***	0.0243
Further Study	0.0668***	0.0135
Others/Unknown/Overseas	-0.0065	0.0165
Human Geography		
Being on Benefit	0.0479	0.0307
Paid Employment	-0.142**	0.0496
Further Study	0.0363	0.0212
Others/Unknown/Overseas	0.0578*	0.0289
Law		
Being on Benefit	0.0159*	0.0072
Paid Employment	0.0094	0.0238
Further Study	0.0441***	0.0110
Others/Unknown/Overseas	-0.0694***	0.0166
Management, Human Resources, Industrial Relations, International Business and Other Business		
Being on Benefit	0.0076	0.0075
Paid Employment	-0.0616**	0.0219
Further Study	0.0056	0.0085
Others/Unknown/Overseas	0.0484**	0.0169
Marketing and Tourism		
Being on Benefit	0.0069	0.0065
Paid Employment	-0.0852**	0.0248
Further Study	-0.0103	0.0073
Others/Unknown/Overseas	0.0886***	0.0218
Molecular, Cellular and Whole Organism Biology		
Being on Benefit	0.0285**	0.0098
Paid Employment	-0.1702***	0.0313
Further Study	0.0916***	0.0189
Others/Unknown/Overseas	0.0501	0.0306

Music, Literary Arts and Other Arts		
Being on Benefit	0.0831***	0.0167
Paid Employment	-0.2142***	0.0301
Further Study	0.0526**	0.0189
Others/Unknown/Overseas	0.0785**	0.0228
Māori Knowledge and Development		
Being on Benefit	0.0758*	0.0292
Paid Employment	-0.0120	0.0477
Further Study	0.0241	0.0273
Others/Unknown/Overseas	-0.0879**	0.0334
Other Health Studies (including Rehabilitation Therapies)		
Being on Benefit	0.0156	0.0088
Paid Employment	0.0176	0.0284
Further Study	0.0195*	0.0097
Others/Unknown/Overseas	-0.0526*	0.0211
Philosophy		
Being on Benefit	0.0790***	0.0158
Paid Employment	-0.2154***	0.0352
Further Study	0.1228***	0.0246
Others/Unknown/Overseas	0.0135	0.0233
Physics		
Being on Benefit	0.0309	0.0185
Paid Employment	-0.1888***	0.0499
Further Study	0.1492**	0.0442
Others/Unknown/Overseas	0.0087	0.0222
Political Science, International Relations and Public Policy		
Being on Benefit	0.0159*	0.0075
Paid Employment	-0.0850***	0.0239
Further Study	0.0350**	0.0119
Others/Unknown/Overseas	0.0341*	0.0173
Psychology		
Being on Benefit	0.0441***	0.0092
Paid Employment	-0.0996**	0.0299
Further Study	0.0782***	0.0146
Others/Unknown/Overseas	-0.0226	0.0198
Public Health		
Being on Benefit	0.1029**	0.0300
Paid Employment	-0.1529*	0.0681
Further Study	0.0697	0.0363
Others/Unknown/Overseas	-0.0197	0.0287
Pure and Applied Mathematics		
Being on Benefit	0.0310*	0.0120
Paid Employment	-0.1816***	0.0292
Further Study	0.0653**	0.0214
Others/Unknown/Overseas	0.0853**	0.0295

Religious Studies and Theology		
Being on Benefit	0.0331	0.0187
Paid Employment	-0.1471***	0.0386
Further Study	0.0733*	0.0294
Others/Unknown/Overseas	0.0407	0.0292
Sociology, Social Policy, Social Work, Criminology and Gender Studies		
Being on Benefit	0.0589***	0.0122
Paid Employment	-0.1026***	0.0253
Further Study	0.0383**	0.0116
Others/Unknown/Overseas	0.0054	0.0180
Sport and Exercise Science		
Being on Benefit	0.0015	0.0079
Paid Employment	0.0298	0.0271
Further Study	-0.0093	0.0097
Others/Unknown/Overseas	-0.0221	0.0240
Statistics		
Being on Benefit	0.0213	0.0141
Paid Employment	-0.1847***	0.0269
Further Study	0.0942***	0.0168
Others/Unknown/Overseas	0.0692**	0.0241
Theatre and Dance, Film and Television and Multimedia		
Being on Benefit	0.1304***	0.0303
Paid Employment	-0.2224***	0.0596
Further Study	0.0320	0.0214
Others/Unknown/Overseas	0.0599	0.0359
Veterinary Studies and Large Animal Science		
Being on Benefit	0.02378**	0.0091
Paid Employment	0.0376	0.0267
Further Study	0.0225	0.0121
Others/Unknown/Overseas	-0.0840***	0.0215
Visual Arts and Crafts		
Being on Benefit	0.0670***	0.0165
Paid Employment	-0.2006***	0.0482
Further Study	0.0297*	0.0151
Others/Unknown/Overseas	0.1038**	0.0376
Year fixed effects		
First year at the tertiary education institute of the student – 1999		
Being on Benefit	-0.0294***	0.0038
Paid Employment	0.0320*	0.0153
Further Study	-0.0322***	0.0067
Others/Unknown/Overseas	0.0296	0.0164

First year at the tertiary education institute of the student – 2007		
Being on Benefit	-0.0708***	0.0074
Paid Employment	-0.0162	0.0255
Further Study	-0.0376**	0.0121
Others/Unknown/Overseas	0.1245***	0.0231
First year at the tertiary education institute of the student – 2008		
Being on Benefit	-0.0750***	0.0075
Paid Employment	0.0048	0.0250
Further Study	-0.0484***	0.0120
Others/Unknown/Overseas	0.1185***	0.0229
Number of observations	37,341	

Notes: (1) The dependent variable is the *labour market status* of the student. (2) Robust standard errors are clustered on the *id* (*id* is composed of evaluation year, university, and subject area) level. Standard error adjusted for 531 clusters in id. (3) The base outcome variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (4) The base outcome variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. (5) I have estimated all the above coefficients by using university, subject area, and year fixed effects. (6) I am not allowed to identify specific universities due to 5.14.2 entity clause of Stats NZ. (7) * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$.

Table 4.A.2: Determinants of Labour Market Outcomes Baseline Model (Odds Ratios Multinomial Logit)

LABOUR MARKET STATUS	RRR	Robust S.E.
1) BENEFIT		
PBRF Outcomes		
Proportion of academics attaining PBRF rank A	1.0006	0.0047
Proportion of academics attaining PBRF rank B	1.0059*	0.0026
Proportion of academics attaining PBRF rank C(NE)	1.0036	0.0040
Proportion of academics attaining PBRF rank R	1.0110**	0.0037
Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave	1.0018	0.0038
Department Level Characteristics		
Researcher's Position Title		
Proportion of Professors	0.9987	0.0047
Proportion of Associate Professors	1.0089*	0.0041
Proportion of Lecturers	1.0018	0.0035
Proportion of Other Teaching Staff	0.9952	0.0052
Proportion of Other Non-Teaching Staff	1.0025	0.0039
Researcher's Gender		
Proportion of female academics	1.0024	0.0027
Proportion of academics for whom gender is unknown	0.9956	0.0045
Researcher's Age Band		
Proportion of academics in the age band of 20 to 29	1.0023	0.0108
Proportion of academics in the age band of 40 to 49	1.0012	0.0028
Proportion of academics in the age band of 50 to 59	0.9985	0.0035
Proportion of academics in the age band of 60 to 69	0.9959	0.0049
Proportion of academics in the age band of 70 and Over	1.0056	0.0110
Proportion of academics for whom age band is unknown	1.0067	0.0046
Researcher's Ethnicity		
Proportion of Asian academics	0.9992	0.0056
Proportion of Māori academics	1.0035	0.0038
Proportion of Pasifika academics	0.9938	0.0120
Proportion of Middle Eastern/Latin American/African academics	1.0129	0.0192
Proportion of academics belonging to "other ethnicity"	1.0052	0.0036
Proportion of academics for whom ethnicity is unknown	0.9998	0.0022
Student Level Characteristics		
Student's gender		
Female student	0.8540**	0.0436
Student's ethnicity		
Asian student	1.1719	0.0862
Māori student	1.7094***	0.1704
Pasifika student	2.1200***	0.2441
Middle Eastern/Latin American/African student	2.8812***	0.6111

Student belonging to “other ethnicity”	1.6008**	0.2525
Student for whom ethnicity is unknown	1.4054	0.4230
Student’s high school decile		
School decile 1	0.9342	0.1665
School decile 2	1.1053	0.1608
School decile 3	0.9513	0.1101
School decile 4	0.9409	0.1274
School decile 6	0.9792	0.1118
School decile 7	0.8757	0.1042
School decile 8	0.8246	0.0986
School decile 9	0.8206	0.0981
School decile 10	0.5555***	0.0642
School decile missing	1.2393	0.3631
Level of NCEA achieved by the student		
Achieved less than NCEA level 3	1.7091***	0.1068
Overseas equivalent to NCEA level 3	0.6337*	0.1190
Missing observations on NCEA level achieved	1.4262	0.2644
University fixed effects		
University 2	0.4251**	0.1376
University 3	0.8626	0.1689
University 4	0.6802	0.1335
University 5	0.7709	0.1420
University 6	1.2484	0.2395
University 7	1.1492	0.2060
University 8	0.7672	0.1551
Subject Area fixed effects		
Agriculture and Other Applied Biological Sciences	1.7058	0.5315
Anthropology and Archaeology	3.7589***	1.2566
Architecture, Design, Planning, Surveying	2.1654**	0.5161
Biomedical	0.9481	0.4968
Chemistry	2.5651**	0.7451
Clinical Medicine	0.1973***	0.0397
Communications, Journalism and Media Studies	1.8627*	0.5708
Computer Science, Information Technology, Information Sciences	1.6222*	0.3955
Dentistry	2.3179***	0.5261
Design	2.2774**	0.6815
Earth Sciences	2.1706**	0.5898
Ecology, Evolution and Behaviour	3.0588***	0.7954
Economics	1.2722	0.2957
Education	2.2971**	0.5825
Engineering and Technology	1.3171	0.4267
English Language and Literature	3.5360***	0.8879
Foreign Languages and Linguistics	2.3557**	0.6642
History, History of Art, Classics and Curatorial Studies	3.2370***	0.7590

Human Geography	3.1582*	1.5290
Law	1.4930	0.3290
Management, Human Resources, Industrial Relations, International Business and Other Business	1.3595	0.3282
Marketing and Tourism	1.3843	0.2888
Molecular, Cellular and Whole Organism Biology	2.4992***	0.6205
Music, Literary Arts and Other Arts	5.1966***	1.3624
Māori Knowledge and Development	3.5029**	1.2827
Other Health Studies (including Rehabilitation Therapies)	1.4676	0.3862
Philosophy	5.0219***	1.2448
Physics	2.6878**	0.9868
Political Science, International Relations and Public Policy	1.7095*	0.3899
Psychology	2.8029***	0.6571
Public Health	5.4575***	2.0447
Pure and Applied Mathematics	2.6555***	0.7104
Religious Studies and Theology	2.5857*	0.9231
Sociology, Social Policy, Social Work, Criminology and Gender Studies	3.3727***	0.8476
Sport and Exercise Science	1.0082	0.2658
Statistics	2.2559*	0.7063
Theatre and Dance, Film and Television and Multimedia	7.4722***	2.6127
Veterinary Studies and Large Animal Science	1.6814*	0.3872
Visual Arts and Crafts	4.3519***	1.2794
Year fixed effects		
First year at the tertiary education institute of the student – 1999	0.5451***	0.0429
First year at the tertiary education institute of the student – 2007	0.2659***	0.0413
First year at the tertiary education institute of the student – 2008	0.2379***	0.0373
constant	0.0967***	0.0423
2) EMPLOYMENT	(base outcome)	
3) STUDY		
PBRF Outcomes		
Proportion of academics attaining PBRF rank A	1.0049	0.0045
Proportion of academics attaining PBRF rank B	1.0037	0.0027
Proportion of academics attaining PBRF rank C(NE)	1.0015	0.0050
Proportion of academics attaining PBRF rank R	1.0133**	0.0045
Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave	1.0144***	0.0033
Department Level Characteristics		
Researcher's Position Title		
Proportion of Professors	0.9920	0.0043
Proportion of Associate Professors	0.9964	0.0044
Proportion of Lecturers	0.9978	0.0035
Proportion of Other Teaching Staff	0.9967	0.0048

Proportion of Other Non-Teaching Staff	1.0016	0.0041
Researcher's Gender		
Proportion of female academics	1.0013	0.0024
Proportion of academics for whom gender is unknown	1.0098	0.0053
Researcher's Age Band		
Proportion of academics in the age band of 20 to 29	1.0021	0.0105
Proportion of academics in the age band of 40 to 49	0.9986	0.0035
Proportion of academics in the age band of 50 to 59	0.9970	0.0039
Proportion of academics in the age band of 60 to 69	1.0007	0.0049
Proportion of academics in the age band of 70 and Over	1.0243*	0.0104
Proportion of academics for whom age band is unknown	0.9936	0.0052
Researcher's Ethnicity		
Proportion of Asian academics	1.0043	0.0047
Proportion of Māori academics	1.0067	0.0045
Proportion of Pasifika academics	0.9865	0.0112
Proportion of Middle Eastern/Latin American/African academics	1.0307	0.0169
Proportion of academics belonging to "other ethnicity"	1.0086**	0.0032
Proportion of academics for whom ethnicity is unknown	1.0018	0.0024
Student Level Characteristics		
Student's gender		
Female student	0.7318***	0.0414
Student's ethnicity		
Asian student	1.8502***	0.1777
Māori student	1.9036***	0.2111
Pasifika student	1.8564***	0.2459
Middle Eastern/Latin American/African student	2.6824***	0.6177
Student belonging to "other ethnicity"	1.4114*	0.1972
Student for whom ethnicity is unknown	1.0373	0.3559
Student's high school decile		
School decile 1	0.9791	0.1696
School decile 2	1.0314	0.1636
School decile 3	1.1517	0.1348
School decile 4	0.9577	0.1252
School decile 6	0.8863	0.0927
School decile 7	1.0877	0.1089
School decile 8	0.9398	0.1029
School decile 9	1.0407	0.1085
School decile 10	0.9821	0.0967
School decile missing	1.5542	0.3995
Level of NCEA achieved by the student		
Achieved less than NCEA level 3	1.4518***	0.0905
Overseas equivalent to NCEA level 3	0.9638	0.1161
Missing observations on NCEA level achieved	1.5970**	0.2691

University fixed effects		
University 2	0.5122*	0.1642
University 3	0.8486	0.1213
University 4	0.6983**	0.0949
University 5	0.8252	0.1215
University 6	0.9661	0.1341
University 7	0.9275	0.1371
University 8	0.7888	0.1418
Subject Area fixed effects		
Agriculture and Other Applied Biological Sciences	2.3205***	0.5468
Anthropology and Archaeology	3.0886***	0.8184
Architecture, Design, Planning, Surveying	1.7683**	0.3814
Biomedical	2.3885**	0.7338
Chemistry	5.7923***	1.8171
Clinical Medicine	1.6865	0.4495
Communications, Journalism and Media Studies	0.9446	0.2413
Computer Science, Information Technology, Information Sciences	1.5863*	0.3158
Dentistry	0.8470	0.1933
Design	1.1767	0.3200
Earth Sciences	2.5068***	0.6042
Ecology, Evolution and Behaviour	2.7681***	0.6579
Economics	1.6846**	0.3279
Education	1.3146	0.2953
Engineering and Technology	1.3826	0.3845
English Language and Literature	2.8312***	0.6674
Foreign Languages and Linguistics	3.5520***	0.6571
History, History of Art, Classics and Curatorial Studies	2.8472***	0.5671
Human Geography	2.1859*	0.7453
Law	1.9041**	0.3619
Management, Human Resources, Industrial Relations, International Business and Other Business	1.2210	0.2284
Marketing and Tourism	0.8860	0.1649
Molecular, Cellular and Whole Organism Biology	3.8081***	0.8514
Music, Literary Arts and Other Arts	2.9731***	0.7771
Māori Knowledge and Development	1.5328	0.6573
Other Health Studies (including Rehabilitation Therapies)	1.3768	0.2751
Philosophy	5.0697***	1.2458
Physics	5.5703***	1.9609
Political Science, International Relations and Public Policy	1.9637**	0.4175
Psychology	3.0589***	0.6590
Public Health	3.1130**	1.3515
Pure and Applied Mathematics	3.1527***	0.7907
Religious Studies and Theology	3.1774***	0.9751
Sociology, Social Policy, Social Work, Criminology and Gender Studies	2.0974***	0.4314

Sport and Exercise Science	0.7737	0.1906
Statistics	3.9834***	0.8039
Theatre and Dance, Film and Television and Multimedia	2.4004*	0.8643
Veterinary Studies and Large Animal Science	1.4021	0.3148
Visual Arts and Crafts	2.2357**	0.6314
Year fixed effects		
First year at the tertiary education institute of the student – 1999	0.6282***	0.0579
First year at the tertiary education institute of the student – 2007	0.6282**	0.1097
First year at the tertiary education institute of the student – 2008	0.5298***	0.0914
constant	0.0908***	0.0412
4) OTHER		
PBRF Outcomes		
Proportion of academics attaining PBRF rank A	1.0001	0.0034
Proportion of academics attaining PBRF rank B	1.0003	0.0018
Proportion of academics attaining PBRF rank C(NE)	0.9966	0.0031
Proportion of academics attaining PBRF rank R	0.9986	0.0038
Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave	1.0082*	0.0036
Department Level Characteristics		
Researcher's Position Title		
Proportion of Professors	0.9988	0.0032
Proportion of Associate Professors	1.0022	0.0031
Proportion of Lecturers	0.9958	0.0023
Proportion of Other Teaching Staff	0.9952	0.0041
Proportion of Other Non-Teaching Staff	1.0054	0.0030
Researcher's Gender		
Proportion of female academics	1.0039	0.0022
Proportion of academics for whom gender is unknown	1.0047	0.0041
Researcher's Age Band		
Proportion of academics in the age band of 20 to 29	1.0239**	0.0080
Proportion of academics in the age band of 40 to 49	0.9991	0.0024
Proportion of academics in the age band of 50 to 59	0.9995	0.0026
Proportion of academics in the age band of 60 to 69	0.9948	0.0035
Proportion of academics in the age band of 70 and Over	1.0046	0.0072
Proportion of academics for whom age band is unknown	0.9960	0.0034
Researcher's Ethnicity		
Proportion of Asian academics	0.9968	0.0028
Proportion of Māori academics	1.0093**	0.0032
Proportion of Pasifika academics	0.9945	0.0074
Proportion of Middle Eastern/Latin American/African academics	1.0121	0.0089
Proportion of academics belonging to "other ethnicity"	1.0043	0.0025
Proportion of academics for whom ethnicity is unknown	1.0007	0.0020

Student Level Characteristics		
Student's gender		
Female student	1.1072**	0.0365
Student's ethnicity		
Asian student	2.0857***	0.1337
Māori student	1.1070	0.0963
Pasifika student	1.3658**	0.1276
Middle Eastern/Latin American/African student	2.7808***	0.4112
Student belonging to "other ethnicity"	1.7251***	0.1780
Student for whom ethnicity is unknown	2.0367***	0.4004
Student's high school decile		
School decile 1	0.6827**	0.1002
School decile 2	0.9975	0.1167
School decile 3	0.9033	0.0776
School decile 4	0.8997	0.0733
School decile 6	0.8687	0.0705
School decile 7	1.1066	0.0787
School decile 8	0.9871	0.0760
School decile 9	1.0464	0.0778
School decile 10	1.1115	0.0855
School decile missing	1.2116	0.2321
Level of NCEA achieved by the student		
Achieved less than NCEA level 3	1.1279**	0.0452
Overseas equivalent to NCEA level 3	1.2628**	0.0970
Missing observations on NCEA level achieved	1.3630*	0.1953
University fixed effects		
University 2	0.9773	0.1480
University 3	1.0169	0.1275
University 4	1.0169	0.1455
University 5	1.1746	0.1619
University 6	1.3118	0.1879
University 7	1.2340	0.1683
University 8	1.3279	0.2195
Subject area fixed effects		
Agriculture and Other Applied Biological Sciences	0.8307	0.1337
Anthropology and Archaeology	1.2729	0.2841
Architecture, Design, Planning, Surveying	1.4680**	0.2042
Biomedical	0.5210	0.3441
Chemistry	1.0132	0.1735
Clinical Medicine	0.1010***	0.0481
Communications, Journalism and Media Studies	1.5462**	0.2177
Computer Science, Information Technology, Information Sciences	0.9222	0.1441
Dentistry	0.7954	0.1769

Design	2.0660***	0.3290
Earth Sciences	1.6849***	0.2205
Ecology, Evolution and Behaviour	1.0193	0.1602
Economics	1.6854***	0.1907
Education	0.6875**	0.0961
Engineering and Technology	1.3042	0.2481
English Language and Literature	1.2032	0.1614
Foreign Languages and Linguistics	2.0166***	0.2481
History, History of Art, Classics and Curatorial Studies	1.1427	0.1292
Human Geography	1.6227**	0.2993
Law	0.6214***	0.0831
Management, Human Resources, Industrial Relations, International Business and Other Business	1.3736**	0.1521
Marketing and Tourism	1.6666***	0.2130
Molecular, Cellular and Whole Organism Biology	1.6503**	0.2914
Music, Literary Arts and Other Arts	2.0040***	0.2812
Māori Knowledge and Development	0.5390	0.1871
Other Health Studies (including Rehabilitation Therapies)	0.7020*	0.1219
Philosophy	1.5174*	0.2571
Physics	1.4086*	0.2402
Political Science, International Relations and Public Policy	1.3367*	0.1552
Psychology	1.0172	0.1524
Public Health	1.1304	0.2875
Pure and Applied Mathematics	1.9342***	0.2861
Religious Studies and Theology	1.5222*	0.2814
Sociology, Social Policy, Social Work, Criminology and Gender Studies	1.1961	0.1488
Sport and Exercise Science	0.8475	0.1461
Statistics	1.8301***	0.2565
Theatre and Dance, Film and Television and Multimedia	1.8934*	0.4682
Veterinary Studies and Large Animal Science	0.5246**	0.1059
Visual Arts and Crafts	2.1389**	0.4705
Year fixed effects		
First year at the tertiary education institute of the student – 1999	1.1222	0.1234
First year at the tertiary education institute of the student – 2007	2.0217***	0.3214
First year at the tertiary education institute of the student – 2008	1.8973***	0.2969
constant	0.0854***	0.0268
Number of observations	37,341	

Notes: (1) The dependent variable is the *labour market status* of the student. (2) Robust standard errors are clustered on the *id* (*id* is composed of evaluation year, university, and subject area) level. Standard error adjusted for 531 clusters in id. (3) The base outcome variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (4) The base outcome variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. (5) I have estimated all the above coefficients by using university, subject area, and year fixed effects. (6) I am not allowed to identify specific universities due to 5.14.2 entity clause of Stats NZ. (7) * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$.

Appendix 4B: Marginal Effects of Multinomial Logit for two PBRF Waves

Table 4.B.1: Determinants of Labour Market Outcomes
Subsample Analysis – PBRF Wave 2003 (Marginal Effects of Multinomial Logit)

	dy/dx	Standard Error
PBRF Outcomes		
Proportion of academics attaining PBRF rank A		
Being on Benefit	0.0006	0.0008
Paid Employment	0.0006	0.0014
Further Study	-0.0011	0.0009
Others/Unknown/Overseas	-0.0001	0.0008
Proportion of academics attaining PBRF rank B		
Being on Benefit	0.0003	0.0005
Paid Employment	-0.0009	0.0010
Further Study	0.0012	0.0007
Others/Unknown/Overseas	-0.0006	0.0006
Proportion of academics attaining PBRF rank C(NE)		
Being on Benefit	n.a.	n.a.
Paid Employment	n.a.	n.a.
Further Study	n.a.	n.a.
Others/Unknown/Overseas	n.a.	n.a.
Proportion of academics attaining PBRF rank R		
Being on Benefit	0.0005	0.0006
Paid Employment	0.0003	0.0011
Further Study	0.0007	0.0008
Others/Unknown/Overseas	-0.0015*	0.0007
Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave		
Being on Benefit	-0.0002	0.0005
Paid Employment	-0.0001	0.0010
Further Study	0.0009	0.0007
Others/Unknown/Overseas	-0.0006	0.0007
Department Level Characteristics		
Researcher's Position Title		
Proportion of Professors		
Being on Benefit	0.0004	0.0009
Paid Employment	0.0003	0.0017
Further Study	-0.0007	0.0009
Others/Unknown/Overseas	0.0000	0.0009
Proportion of Associate Professors		
Being on Benefit	-0.0008	0.0007
Paid Employment	0.0013	0.0014
Further Study	0.0003	0.0008
Others/Unknown/Overseas	-0.0008	0.0008

Proportion of Lecturers		
Being on Benefit	0.0000	0.0005
Paid Employment	-0.0003	0.0009
Further Study	0.0015*	0.0007
Others/Unknown/Overseas	-0.0011*	0.0005
Proportion of Other Teaching Staff		
Being on Benefit	-0.0003	0.0007
Paid Employment	0.0011	0.0011
Further Study	-0.0004	0.0007
Others/Unknown/Overseas	-0.0004	0.0006
Proportion of Other Non-Teaching Staff		
Being on Benefit	0.0003	0.0005
Paid Employment	-0.0004	0.0010
Further Study	0.0000	0.0008
Others/Unknown/Overseas	0.0001	0.0006
Researcher's Gender		
Proportion of female academics		
Being on Benefit	0.0002	0.0004
Paid Employment	-0.0007	0.0007
Further Study	-0.0006	0.0005
Others/Unknown/Overseas	0.0011*	0.0005
Proportion of academics for whom gender is unknown		
Being on Benefit	0.0050	0.0033
Paid Employment	-0.0149*	0.0065
Further Study	0.0121*	0.0052
Others/Unknown/Overseas	-0.0022	0.0023
Researcher's Age Band		
Proportion of academics in the age band of 20 to 29		
Being on Benefit	-0.0004	0.0010
Paid Employment	0.0005	0.0023
Further Study	0.0022	0.0015
Others/Unknown/Overseas	-0.0022	0.0013
Proportion of academics in the age band of 40 to 49		
Being on Benefit	0.0005	0.0004
Paid Employment	0.0005	0.0008
Further Study	-0.0002	0.0006
Others/Unknown/Overseas	-0.0008	0.0006
Proportion of academics in the age band of 50 to 59		
Being on Benefit	-0.0006	0.0006
Paid Employment	0.0023*	0.0011
Further Study	-0.0011	0.0008
Others/Unknown/Overseas	-0.0006	0.0008

Proportion of academics in the age band of 60 to 69		
Being on Benefit	-0.0014	0.0008
Paid Employment	0.0035*	0.0014
Further Study	0.0000	0.0009
Others/Unknown/Overseas	-0.0021*	0.0009
Proportion of academics in the age band of 70 and Over		
Being on Benefit	0.0001	0.0109
Paid Employment	0.0016	0.0135
Further Study	0.0024	0.0119
Others/Unknown/Overseas	-0.0040	0.0071
Proportion of academics for whom age band is unknown		
Being on Benefit	0.0001	0.0005
Paid Employment	0.0004	0.0009
Further Study	-0.0001	0.0006
Others/Unknown/Overseas	-0.0004	0.0005
Researcher's Ethnicity		
Proportion of Asian academics		
Being on Benefit	0.0005	0.0009
Paid Employment	0.001	0.0016
Further Study	-0.0016	0.0011
Others/Unknown/Overseas	0.0001	0.0010
Proportion of Māori academics		
Being on Benefit	0.0003	0.0007
Paid Employment	-0.0003	0.0015
Further Study	-0.001	0.0009
Others/Unknown/Overseas	0.0010	0.0011
Proportion of Pasifika academics		
Being on Benefit	-0.0024	0.0023
Paid Employment	0.004	0.0049
Further Study	-0.0048	0.0041
Others/Unknown/Overseas	0.0031	0.0030
Proportion of Middle Eastern/Latin American/African academics		
Being on Benefit	n.a.	n.a.
Paid Employment	n.a.	n.a.
Further Study	n.a.	n.a.
Others/Unknown/Overseas	n.a.	n.a.
Proportion of academics belonging to "other ethnicity"		
Being on Benefit	0.0000	0.0005
Paid Employment	0.0006	0.0011
Further Study	-0.0002	0.0008
Others/Unknown/Overseas	-0.0004	0.0005
Proportion of academics for whom ethnicity is unknown		
Being on Benefit	-0.0001	0.0003
Paid Employment	0.0001	0.0006

Further Study	0.0000	0.0004
Others/Unknown/Overseas	0.0000	0.0004
Student Level Characteristics		
Student's gender		
Female student		
Being on Benefit	0.0197*	0.0086
Paid Employment	-0.0175	0.0157
Further Study	-0.0225	0.0141
Others/Unknown/Overseas	0.0203*	0.0088
Student's ethnicity		
Asian student		
Being on Benefit	-0.0144	0.0140
Paid Employment	-0.1483***	0.0331
Further Study	0.0849***	0.0248
Others/Unknown/Overseas	0.0777***	0.0106
Māori student		
Being on Benefit	0.0490***	0.0141
Paid Employment	-0.1070	0.0256
Further Study	0.0740***	0.0206
Others/Unknown/Overseas	-0.0160	0.0185
Pasifika student		
Being on Benefit	0.0850***	0.0172
Paid Employment	-0.0729*	0.0336
Further Study	0.0082	0.0324
Others/Unknown/Overseas	-0.0202	0.0248
Middle Eastern/Latin American/African student		
Being on Benefit	n.a.	n.a.
Paid Employment	n.a.	n.a.
Further Study	n.a.	n.a.
Others/Unknown/Overseas	n.a.	n.a.
Student belonging to "other ethnicity"		
Being on Benefit	0.0151	0.0222
Paid Employment	-0.1372***	0.0396
Further Study	0.0612*	0.0270
Others/Unknown/Overseas	0.0609***	0.0183
Student for whom ethnicity is unknown		
Being on Benefit	0.0175	0.0399
Paid Employment	-0.0530	0.0780
Further Study	-0.0530	0.0723
Others/Unknown/Overseas	0.0884**	0.0339

Student's high school decile		
School decile 1		
Being on Benefit	-0.0154	0.0252
Paid Employment	-0.0523	0.0506
Further Study	0.0501	0.0311
Others/Unknown/Overseas	0.0177	0.0377
School decile 2		
Being on Benefit	0.0079	0.0228
Paid Employment	-0.0545	0.0406
Further Study	0.0392	0.0320
Others/Unknown/Overseas	0.0073	0.0234
School decile 3		
Being on Benefit	-0.0106	0.0175
Paid Employment	-0.0345	0.0328
Further Study	0.0500*	0.0213
Others/Unknown/Overseas	-0.0049	0.0206
School decile 4		
Being on Benefit	-0.0073	0.0179
Paid Employment	-0.0180	0.0277
Further Study	0.0343	0.0233
Others/Unknown/Overseas	-0.0090	0.0174
School decile 6		
Being on Benefit	-0.0017	0.0158
Paid Employment	-0.0002	0.0242
Further Study	0.0218	0.0184
Others/Unknown/Overseas	-0.0199	0.0170
School decile 7		
Being on Benefit	-0.0400*	0.0181
Paid Employment	0.0367	0.0282
Further Study	0.0090	0.0211
Others/Unknown/Overseas	-0.0057	0.0173
School decile 8		
Being on Benefit	-0.0230	0.0180
Paid Employment	0.0043	0.0267
Further Study	0.0005	0.0195
Others/Unknown/Overseas	0.0182	0.0179
School decile 9		
Being on Benefit	-0.0367*	0.0172
Paid Employment	-0.0118	0.0268
Further Study	0.0482*	0.0202
Others/Unknown/Overseas	0.0004	0.0156
School decile 10		
Being on Benefit	-0.0596***	0.0163
Paid Employment	0.0286	0.0257
Further Study	0.0334	0.0190
Others/Unknown/Overseas	-0.0024	0.0150

School decile missing		
Being on Benefit	0.0050	0.0515
Paid Employment	-0.0169	0.1132
Further Study	0.0113	0.0697
Others/Unknown/Overseas	0.0006	0.0531
Level of NCEA achieved by the student		
Achieved less than NCEA level 3		
Being on Benefit	0.0412***	0.0091
Paid Employment	-0.0561***	0.0139
Further Study	0.0178	0.0093
Others/Unknown/Overseas	-0.0028	0.0086
Overseas equivalent to NCEA level 3		
Being on Benefit	0.0401	0.0530
Paid Employment	0.0375	0.0870
Further Study	0.0063	0.0500
Others/Unknown/Overseas	-0.0839	0.0504
Missing observations on NCEA level achieved		
Being on Benefit	0.0221	0.0216
Paid Employment	-0.0454	0.0359
Further Study	0.0459	0.0240
Others/Unknown/Overseas	-0.0226	0.0204
University fixed effects		
University 1		
University 2		
Being on Benefit	-0.0396	0.0591
Paid Employment	-0.0324	0.0565
Further Study	0.0661	0.1090
Others/Unknown/Overseas	0.0058	0.0161
University 3		
Being on Benefit	0.0301	0.0681
Paid Employment	0.0164	0.0452
Further Study	-0.0477	0.1009
Others/Unknown/Overseas	0.0013	0.0159
University 4		
Being on Benefit	-0.1699	0.1535
Paid Employment	0.7587**	0.2662
Further Study	-0.6631**	0.2542
Others/Unknown/Overseas	0.0743	0.1837
University 5		
Being on Benefit	-0.0275	0.0583
Paid Employment	-0.0253	0.0468
Further Study	0.058	0.0919
Others/Unknown/Overseas	-0.0052	0.0115

University 6		
Being on Benefit	0.0246	0.0544
Paid Employment	-0.0177	0.0339
Further Study	-0.0102	0.0696
Others/Unknown/Overseas	0.0033	0.0095
University 7		
Being on Benefit	-0.0073	0.0377
Paid Employment	0.0096	0.0317
Further Study	0.0066	0.0571
Others/Unknown/Overseas	-0.009	0.0110
University 8		
Being on Benefit	0.0008	0.0564
Paid Employment	0.0551	0.0531
Further Study	-0.0633	0.0888
Others/Unknown/Overseas	0.0074	0.0135
Subject area fixed effects		
Accounting and Finance		
Agriculture and Other Applied Biological Sciences		
Being on Benefit	0.0395	0.0432
Paid Employment	-0.0206	0.0673
Further Study	0.0129	0.0538
Others/Unknown/Overseas	-0.0317	0.0466
Anthropology and Archaeology		
Being on Benefit	0.0023	0.0370
Paid Employment	-0.1065	0.1136
Further Study	0.0995	0.0784
Others/Unknown/Overseas	0.0048	0.0720
Architecture, Design, Planning, Surveying		
Being on Benefit	0.0365	0.0295
Paid Employment	-0.0620	0.0513
Further Study	0.0561	0.0290
Others/Unknown/Overseas	-0.0306	0.0342
Biomedical		
Being on Benefit	-0.0124	0.0537
Paid Employment	0.0825	0.1025
Further Study	0.0165	0.0859
Others/Unknown/Overseas	-0.0867*	0.0378
Chemistry		
Being on Benefit	0.0280	0.0535
Paid Employment	-0.1477	0.1414
Further Study	0.1732	0.1173
Others/Unknown/Overseas	-0.0535	0.0579

Clinical Medicine		
Being on Benefit	-0.0791***	0.0183
Paid Employment	0.1052**	0.0386
Further Study	0.1039**	0.0352
Others/Unknown/Overseas	-0.1300***	0.0238
Communications, Journalism and Media Studies		
Being on Benefit	0.1141*	0.0523
Paid Employment	0.0063	0.0611
Further Study	-0.0413	0.0305
Others/Unknown/Overseas	-0.0790*	0.0395
Computer Science, Information Technology, Information Sciences		
Being on Benefit	0.0431	0.0307
Paid Employment	-0.0259	0.0497
Further Study	-0.0276	0.0246
Others/Unknown/Overseas	0.0104	0.0372
Dentistry		
Being on Benefit	0.0402	0.0245
Paid Employment	-0.0221	0.0403
Further Study	-0.0080	0.0320
Others/Unknown/Overseas	-0.0101	0.0343
Design		
Being on Benefit	0.0350	0.0344
Paid Employment	-0.1055*	0.0471
Further Study	0.0033	0.0251
Others/Unknown/Overseas	0.0672	0.0469
Earth Sciences		
Being on Benefit	0.1116*	0.0481
Paid Employment	-0.0829	0.0900
Further Study	-0.0054	0.0413
Others/Unknown/Overseas	-0.0233	0.0516
Ecology, Evolution and Behaviour		
Being on Benefit	0.0715	0.0498
Paid Employment	-0.0413	0.0751
Further Study	0.0603	0.0855
Others/Unknown/Overseas	-0.0905*	0.0400
Economics		
Being on Benefit	0.0323	0.0258
Paid Employment	-0.0646	0.0469
Further Study	0.0336	0.0317
Others/Unknown/Overseas	-0.0013	0.0386
Education		
Being on Benefit	0.0483	0.0255
Paid Employment	-0.0377	0.0473
Further Study	0.0324	0.0312
Others/Unknown/Overseas	-0.043	0.0325

Engineering and Technology		
Being on Benefit	-0.0228	0.0246
Paid Employment	0.1303	0.0698
Further Study	-0.0414	0.0355
Others/Unknown/Overseas	-0.0661	0.0440
English Language and Literature		
Being on Benefit	0.0962*	0.0379
Paid Employment	-0.1281**	0.0454
Further Study	0.0382	0.0345
Others/Unknown/Overseas	-0.0064	0.0331
Foreign Languages and Linguistics		
Being on Benefit	-0.0316	0.0295
Paid Employment	-0.1529***	0.0439
Further Study	0.1289***	0.0354
Others/Unknown/Overseas	0.0556	0.0385
History, History of Art, Classics and Curatorial Studies		
Being on Benefit	0.0921**	0.0353
Paid Employment	-0.0629	0.0452
Further Study	0.0467	0.0366
Others/Unknown/Overseas	-0.0758*	0.0321
Human Geography		
Being on Benefit	0.2631**	0.1018
Paid Employment	-0.1630	0.0996
Further Study	-0.0335	0.0888
Others/Unknown/Overseas	-0.0667	0.0610
Law		
Being on Benefit	0.015	0.0212
Paid Employment	0.0374	0.0297
Further Study	0.0090	0.0178
Others/Unknown/Overseas	-0.0614**	0.0235
Management, Human Resources, Industrial Relations, International Business and Other Business		
Being on Benefit	0.0328	0.0296
Paid Employment	0.0138	0.0388
Further Study	-0.0415*	0.0208
Others/Unknown/Overseas	-0.0052	0.0286
Marketing and Tourism		
Being on Benefit	-0.0271	0.0207
Paid Employment	-0.0071	0.0401
Further Study	-0.0360	0.0279
Others/Unknown/Overseas	0.0702*	0.0336
Molecular, Cellular and Whole Organism Biology		
Being on Benefit	0.0165	0.0341
Paid Employment	-0.1079	0.0832
Further Study	0.1515*	0.0701
Others/Unknown/Overseas	-0.0602	0.0484

Music, Literary Arts and Other Arts		
Being on Benefit	0.1766	0.0953
Paid Employment	-0.1040	0.0749
Further Study	-0.0333	0.0445
Others/Unknown/Overseas	-0.0393	0.0415
Māori Knowledge and Development		
Being on Benefit	0.1324	0.1100
Paid Employment	0.0065	0.1149
Further Study	-0.0052	0.0620
Others/Unknown/Overseas	-0.1338***	0.0282
Other Health Studies (including Rehabilitation Therapies)		
Being on Benefit	-0.0111	0.0226
Paid Employment	0.0592	0.0364
Further Study	0.0272	0.0222
Others/Unknown/Overseas	-0.0753**	0.0285
Philosophy		
Being on Benefit	0.0701	0.0578
Paid Employment	-0.1723*	0.0858
Further Study	0.1614*	0.0688
Others/Unknown/Overseas	-0.0592	0.0533
Physics		
Being on Benefit	0.0497	0.0660
Paid Employment	-0.0919	0.1143
Further Study	0.0165	0.0633
Others/Unknown/Overseas	0.0257	0.0400
Political Science, International Relations and Public Policy		
Being on Benefit	0.0098	0.0288
Paid Employment	-0.0063	0.0459
Further Study	-0.0069	0.0301
Others/Unknown/Overseas	0.0034	0.0401
Psychology		
Being on Benefit	0.0755	0.0400
Paid Employment	-0.0946	0.0562
Further Study	0.0793*	0.0341
Others/Unknown/Overseas	-0.0602	0.0345
Public Health		
Being on Benefit	0.0142	0.0395
Paid Employment	-0.0579	0.1352
Further Study	0.1279	0.1457
Others/Unknown/Overseas	-0.0841	0.0496
Pure and Applied Mathematics		
Being on Benefit	0.0117	0.0299
Paid Employment	-0.0533	0.0485
Further Study	-0.0223	0.0285
Others/Unknown/Overseas	0.0639	0.0466

Religious Studies and Theology		
Being on Benefit	0.0168	0.0575
Paid Employment	-0.0159	0.1147
Further Study	0.0243	0.0506
Others/Unknown/Overseas	-0.0252	0.0872
Sociology, Social Policy, Social Work, Criminology and Gender Studies		
Being on Benefit	0.1125***	0.0337
Paid Employment	-0.0694	0.0437
Further Study	0.0260	0.0374
Others/Unknown/Overseas	-0.0691	0.0359
Sport and Exercise Science		
Being on Benefit	-0.0079	0.0361
Paid Employment	0.0319	0.0615
Further Study	-0.0638*	0.0276
Others/Unknown/Overseas	0.0398	0.0775
Statistics		
Being on Benefit	0.0772	0.0781
Paid Employment	-0.1908**	0.0665
Further Study	0.1111*	0.0475
Others/Unknown/Overseas	0.0025	0.0462
Theatre and Dance, Film and Television and Multimedia		
Being on Benefit	0.3381**	0.1320
Paid Employment	-0.2361	0.1833
Further Study	-0.0578	0.0565
Others/Unknown/Overseas	-0.0443	0.0450
Veterinary Studies and Large Animal Science		
Being on Benefit	0.0239	0.0269
Paid Employment	0.0777*	0.0376
Further Study	0.0063	0.0283
Others/Unknown/Overseas	-0.1079***	0.0254
Visual Arts and Crafts		
Being on Benefit	0.1285*	0.0531
Paid Employment	-0.2127***	0.0504
Further Study	0.0254	0.0337
Others/Unknown/Overseas	0.0588	0.0477

Year fixed effects		
First year at the tertiary education institute of the student – 1999		
Being on Benefit	-0.0559***	0.0072
Paid Employment	0.0822***	0.0131
Further Study	-0.0463***	0.0107
Others/Unknown/Overseas	0.0201*	0.0097
Number of observations	7,122	

Notes: (1) The dependent variable is the *labour market status* of the student. (2) Robust standard errors are clustered on the *id* (*id* is composed of evaluation year, university, and subject area) level. Standard error adjusted for 258 clusters in id. (3) The base outcome variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (4) The base outcome variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. (5) I have estimated all the above coefficients by using university, subject area, and year fixed effects. (6) I am not allowed to identify specific universities due to 5.14.2 entity clause of Stats NZ. (7) * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$.

Table 4.B.2: Determinants of Labour Market Outcomes
Subsample Analysis – PBRF Wave 2012 (Marginal Effects of Multinomial Logit)

	dy/dx	Standard Error
PBRF Outcomes		
Proportion of academics attaining PBRF rank A		
Being on Benefit	0.0000	0.0003
Paid Employment	0.0001	0.0006
Further Study	0.0002	0.0003
Others/Unknown/Overseas	-0.0003	0.0005
Proportion of academics attaining PBRF rank B		
Being on Benefit	0.0002	0.0001
Paid Employment	-0.0002	0.0004
Further Study	0.0001	0.0002
Others/Unknown/Overseas	-0.0001	0.0003
Proportion of academics attaining PBRF rank C(NE)		
Being on Benefit	0.0004	0.0002
Paid Employment	0.0001	0.0006
Further Study	0.0001	0.0003
Others/Unknown/Overseas	-0.0006	0.0005
Proportion of academics attaining PBRF rank R		
Being on Benefit	0.0006	0.0004
Paid Employment	-0.0013	0.0010
Further Study	0.0011*	0.0004
Others/Unknown/Overseas	-0.0004	0.0008
Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave		
Being on Benefit	n.a.	n.a.
Paid Employment	n.a.	n.a.
Further Study	n.a.	n.a.
Others/Unknown/Overseas	n.a.	n.a.
Department Level Characteristics		
Researcher's Position Title		
Proportion of Professors		
Being on Benefit	-0.0002	0.0002
Paid Employment	0.0003	0.0006
Further Study	-0.0004	0.0003
Others/Unknown/Overseas	0.0002	0.0005
Proportion of Associate Professors		
Being on Benefit	0.0007***	0.0002
Paid Employment	-0.0014*	0.0006
Further Study	-0.0001	0.0003
Others/Unknown/Overseas	0.0009	0.0005
Proportion of Lecturers		
Being on Benefit	0.0000	0.0002

Paid Employment	0.0006	0.0004
Further Study	-0.0002	0.0002
Others/Unknown/Overseas	-0.0004	0.0004
Proportion of Other Teaching Staff		
Being on Benefit	-0.0005	0.0005
Paid Employment	0.0034*	0.0014
Further Study	-0.0016**	0.0006
Others/Unknown/Overseas	-0.0013	0.0011
Proportion of Other Non-Teaching Staff		
Being on Benefit	-0.0002	0.0002
Paid Employment	-0.0007	0.0006
Further Study	0.0002	0.0003
Others/Unknown/Overseas	0.0007	0.0005
Researcher's Gender		
Proportion of female academics		
Being on Benefit	0.0001	0.0001
Paid Employment	-0.0006	0.0004
Further Study	0.0002	0.0002
Others/Unknown/Overseas	0.0003	0.0004
Proportion of academics for whom gender is unknown		
Being on Benefit	0.0019*	0.0009
Paid Employment	-0.0036	0.0032
Further Study	0.0006	0.0017
Others/Unknown/Overseas	0.0010	0.0021
Researcher's Age Band		
Proportion of academics in the age band of 20 to 29		
Being on Benefit	-0.0004	0.0008
Paid Employment	-0.0038*	0.0016
Further Study	-0.0012	0.0011
Others/Unknown/Overseas	0.0054**	0.0017
Proportion of academics in the age band of 40 to 49		
Being on Benefit	0.0000	0.0001
Paid Employment	0.0001	0.0004
Further Study	0.0000	0.0002
Others/Unknown/Overseas	-0.0002	0.0004
Proportion of academics in the age band of 50 to 59		
Being on Benefit	0.0000	0.0002
Paid Employment	-0.0002	0.0005
Further Study	0.0001	0.0003
Others/Unknown/Overseas	0.0000	0.0004
Proportion of academics in the age band of 60 to 69		
Being on Benefit	0.0000	0.0002
Paid Employment	0.0005	0.0007
Further Study	0.0003	0.0003
Others/Unknown/Overseas	-0.0007	0.0005
Proportion of academics in the age band of 70 and Over		

Being on Benefit	0.0004	0.0005
Paid Employment	-0.0028	0.0015
Further Study	0.0016**	0.0006
Others/Unknown/Overseas	0.0008	0.0011
Proportion of academics for whom age band is unknown		
Being on Benefit	0.0003	0.0002
Paid Employment	0.0014	0.0008
Further Study	-0.0005	0.0004
Others/Unknown/Overseas	-0.0011*	0.0006
Researcher's Ethnicity		
Proportion of Asian academics		
Being on Benefit	-0.0001	0.0003
Paid Employment	-0.0003	0.0005
Further Study	0.0006*	0.0003
Others/Unknown/Overseas	-0.0003	0.0005
Proportion of Māori academics		
Being on Benefit	0.0002	0.0002
Paid Employment	-0.0020***	0.0006
Further Study	0.0003	0.0003
Others/Unknown/Overseas	0.0015**	0.0005
Proportion of Pasifika academics		
Being on Benefit	0.0001	0.0005
Paid Employment	0.0008	0.0014
Further Study	-0.0002	0.0007
Others/Unknown/Overseas	-0.0007	0.0012
Proportion of Middle Eastern/Latin American/African academics		
Being on Benefit	0.0005	0.0008
Paid Employment	-0.0024	0.0014
Further Study	0.0010	0.0010
Others/Unknown/Overseas	0.0009	0.0015
Proportion of academics belonging to "other ethnicity"		
Being on Benefit	-0.0001	0.0003
Paid Employment	-0.0011*	0.0005
Further Study	0.0003	0.0003
Others/Unknown/Overseas	0.0009	0.0005
Proportion of academics for whom ethnicity is unknown		
Being on Benefit	0.0000	0.0001
Paid Employment	-0.0011*	0.0005
Further Study	0.0005	0.0002
Others/Unknown/Overseas	0.0006	0.0004

Student Level Characteristics

Student's gender

Female student		
Being on Benefit	-0.0127***	0.0023
Paid Employment	0.0137*	0.0063
Further Study	-0.0222***	0.0037
Others/Unknown/Overseas	0.0212***	0.0056
Student's ethnicity		
Asian student		
Being on Benefit	0.0006	0.0035
Paid Employment	-0.1284***	0.0118
Further Study	0.0229***	0.0061
Others/Unknown/Overseas	0.1049***	0.0104
Māori student		
Being on Benefit	0.0171**	0.0054
Paid Employment	-0.0592***	0.0172
Further Study	0.0357***	0.0084
Others/Unknown/Overseas	0.0063	0.0152
Pasifika student		
Being on Benefit	0.0214***	0.0059
Paid Employment	-0.1051***	0.0187
Further Study	0.0406***	0.0086
Others/Unknown/Overseas	0.0431**	0.0156
Middle Eastern/Latin American/African student		
Being on Benefit	0.0315***	0.0086
Paid Employment	-0.2136***	0.0291
Further Study	0.0413**	0.0136
Others/Unknown/Overseas	0.1409***	0.0217
Student belonging to "other ethnicity"		
Being on Benefit	0.0199*	0.0084
Paid Employment	-0.0910***	0.0194
Further Study	-0.0004	0.0113
Others/Unknown/Overseas	0.0715***	0.0182
Student for whom ethnicity is unknown		
Being on Benefit	0.0082	0.0173
Paid Employment	-0.1098*	0.0455
Further Study	-0.0013	0.0235
Others/Unknown/Overseas	0.1030**	0.0361
Student's high school decile		
School decile 1		
Being on Benefit	0.0054	0.0099
Paid Employment	0.0770**	0.0247
Further Study	-0.0092	0.0134
Others/Unknown/Overseas	-0.0732**	0.0251
School decile 2		
Being on Benefit	0.0041	0.0079
Paid Employment	0.0088	0.0224

Further Study	-0.0085	0.0115
Others/Unknown/Overseas	-0.0043	0.0206
School decile 3		
Being on Benefit	0.0001	0.0063
Paid Employment	0.0157	0.0156
Further Study	0.0028	0.0086
Others/Unknown/Overseas	-0.0187	0.0151
School decile 4		
Being on Benefit	-0.001	0.0076
Paid Employment	0.0261	0.0174
Further Study	-0.0099	0.0096
Others/Unknown/Overseas	-0.0151	0.0145
School decile 6		
Being on Benefit	0.0012	0.0068
Paid Employment	0.0305*	0.0141
Further Study	-0.0130	0.0078
Others/Unknown/Overseas	-0.0187	0.0148
School decile 7		
Being on Benefit	-0.0032	0.0066
Paid Employment	-0.0188	0.0140
Further Study	0.0015	0.0071
Others/Unknown/Overseas	0.0204	0.0124
School decile 8		
Being on Benefit	-0.0064	0.0065
Paid Employment	0.0134	0.0150
Further Study	-0.0057	0.0081
Others/Unknown/Overseas	-0.0013	0.0135
School decile 9		
Being on Benefit	-0.0049	0.0066
Paid Employment	0.0016	0.0148
Further Study	-0.0070	0.0076
Others/Unknown/Overseas	0.0102	0.0131
School decile 10		
Being on Benefit	-0.0246***	0.0066
Paid Employment	0.0051	0.0138
Further Study	-0.0082	0.0072
Others/Unknown/Overseas	0.0277*	0.0140
School decile missing		
Being on Benefit	0.0087	0.0148
Paid Employment	-0.0564	0.0345
Further Study	0.0224	0.0177
Others/Unknown/Overseas	0.0253	0.0328
Level of NCEA achieved by the student		
Achieved less than NCEA level 3		
Being on Benefit	0.0216***	0.0030
Paid Employment	-0.0573***	0.0088

Further Study	0.0237***	0.0049
Others/Unknown/Overseas	0.0120	0.0071
Overseas equivalent to NCEA level 3		
Being on Benefit	-0.0265***	0.0080
Paid Employment	-0.0154	0.0169
Further Study	-0.0022	0.0074
Others/Unknown/Overseas	0.0441***	0.0116
Missing observations on NCEA level achieved		
Being on Benefit	0.0116	0.0152
Paid Employment	-0.1149**	0.0369
Further Study	0.0229	0.0184
Others/Unknown/Overseas	0.0804**	0.0309
University fixed effects		
University 1		
University 2		
Being on Benefit	-0.0394***	0.0074
Paid Employment	0.1092***	0.0275
Further Study	-0.0524***	0.0103
Others/Unknown/Overseas	-0.0173	0.0225
University 3		
Being on Benefit	-0.0085	0.0091
Paid Employment	0.0149	0.0228
Further Study	-0.0116	0.0098
Others/Unknown/Overseas	0.0052	0.0167
University 4		
Being on Benefit	-0.0094	0.0094
Paid Employment	0.0173	0.0291
Further Study	-0.0113	0.0105
Others/Unknown/Overseas	0.0034	0.0225
University 5		
Being on Benefit	-0.0149	0.0077
Paid Employment	0.0029	0.0256
Further Study	-0.0116	0.0108
Others/Unknown/Overseas	0.0236	0.0185
University 6		
Being on Benefit	0.0083	0.0092
Paid Employment	-0.0209	0.0275
Further Study	-0.0138	0.0114
Others/Unknown/Overseas	0.0264	0.0211
University 7		
Being on Benefit	0.0080	0.0088
Paid Employment	-0.0271	0.0285
Further Study	-0.0127	0.0107
Others/Unknown/Overseas	0.0318	0.0213

University 8		
Being on Benefit	-0.0101	0.0097
Paid Employment	-0.0146	0.0332
Further Study	-0.0202	0.0150
Others/Unknown/Overseas	0.0449	0.0300
Subject area fixed effects		
Accounting and Finance		
Agriculture and Other Applied Biological Sciences		
Being on Benefit	0.0289*	0.0118
Paid Employment	-0.0644*	0.0290
Further Study	0.0647***	0.0150
Others/Unknown/Overseas	-0.0292	0.0219
Anthropology and Archaeology		
Being on Benefit	0.0812**	0.0263
Paid Employment	-0.1463***	0.0392
Further Study	0.0621*	0.0243
Others/Unknown/Overseas	0.0030	0.0281
Architecture, Design, Planning, Surveying		
Being on Benefit	0.0242*	0.0106
Paid Employment	-0.1078***	0.0240
Further Study	0.0172	0.0089
Others/Unknown/Overseas	0.0664**	0.0223
Biomedical		
Being on Benefit	0.001	0.0173
Paid Employment	-0.0085	0.0790
Further Study	0.0805*	0.0316
Others/Unknown/Overseas	-0.073	0.0758
Chemistry		
Being on Benefit	0.0354*	0.0139
Paid Employment	-0.1947***	0.0458
Further Study	0.2005***	0.0444
Others/Unknown/Overseas	-0.0412	0.0251
Clinical Medicine		
Being on Benefit	-0.0168**	0.0055
Paid Employment	0.1718***	0.0176
Further Study	0.0205**	0.0078
Others/Unknown/Overseas	-0.1755***	0.0136
Communications, Journalism and Media Studies		
Being on Benefit	0.0135	0.0107
Paid Employment	-0.0992***	0.0288
Further Study	-0.0003	0.0098
Others/Unknown/Overseas	0.086***	0.0258
Computer Science, Information Technology, Information Sciences		
Being on Benefit	0.0133	0.0091
Paid Employment	-0.0262	0.0245

Further Study	0.0416***	0.0105
Others/Unknown/Overseas	-0.0287	0.0216
Dentistry		
Being on Benefit	0.0411***	0.0098
Paid Employment	-0.0143	0.0216
Further Study	0.0056	0.0074
Others/Unknown/Overseas	-0.0325	0.0172
Design		
Being on Benefit	0.0231	0.0133
Paid Employment	-0.1735***	0.0316
Further Study	0.0045	0.0131
Others/Unknown/Overseas	0.1458***	0.0314
Earth Sciences		
Being on Benefit	0.0175	0.0104
Paid Employment	-0.1661***	0.0228
Further Study	0.0653***	0.0174
Others/Unknown/Overseas	0.0834***	0.0240
Ecology, Evolution and Behaviour		
Being on Benefit	0.0541***	0.0152
Paid Employment	-0.1231***	0.0304
Further Study	0.0719***	0.0174
Others/Unknown/Overseas	-0.0030	0.0238
Economics		
Being on Benefit	0.0017	0.0073
Paid Employment	-0.1203***	0.0190
Further Study	0.0209**	0.0077
Others/Unknown/Overseas	0.0977***	0.0190
Education		
Being on Benefit	0.0334**	0.0110
Paid Employment	0.0015	0.0256
Further Study	0.0133	0.0093
Others/Unknown/Overseas	-0.0481**	0.0186
Engineering and Technology		
Being on Benefit	0.0154	0.0132
Paid Employment	-0.0909**	0.0318
Further Study	0.0289	0.0170
Others/Unknown/Overseas	0.0465	0.0345
English Language and Literature		
Being on Benefit	0.0552***	0.0124
Paid Employment	-0.1227***	0.0276
Further Study	0.0561**	0.0190
Others/Unknown/Overseas	0.0113	0.0249
Foreign Languages and Linguistics		
Being on Benefit	0.0261*	0.0112
Paid Employment	-0.1966***	0.0279
Further Study	0.0655***	0.0125

Others/Unknown/Overseas	0.105***	0.0214
History, History of Art, Classics and Curatorial Studies		
Being on Benefit	0.0444***	0.0101
Paid Employment	-0.1122***	0.0222
Further Study	0.0576***	0.0089
Others/Unknown/Overseas	0.0102	0.0174
Human Geography		
Being on Benefit	0.0278	0.0281
Paid Employment	-0.1770***	0.0497
Further Study	0.0540**	0.0191
Others/Unknown/Overseas	0.0952**	0.0324
Law		
Being on Benefit	0.0136	0.0085
Paid Employment	-0.0029	0.0231
Further Study	0.0565***	0.0114
Others/Unknown/Overseas	-0.0671***	0.0172
Management, Human Resources, Industrial Relations, International Business and Other Business		
Being on Benefit	0.0015	0.0061
Paid Employment	-0.0741***	0.0198
Further Study	0.0121	0.0079
Others/Unknown/Overseas	0.0605***	0.0162
Marketing and Tourism		
Being on Benefit	0.0101	0.0056
Paid Employment	-0.1008***	0.0243
Further Study	-0.0066	0.0053
Others/Unknown/Overseas	0.0973***	0.0229
Molecular, Cellular and Whole Organism Biology		
Being on Benefit	0.0417***	0.0116
Paid Employment	-0.208***	0.0306
Further Study	0.0889***	0.0200
Others/Unknown/Overseas	0.0774*	0.0314
Music, Literary Arts and Other Arts		
Being on Benefit	0.0616***	0.0162
Paid Employment	-0.2435***	0.0320
Further Study	0.0625***	0.0186
Others/Unknown/Overseas	0.1194***	0.0274
Māori Knowledge and Development		
Being on Benefit	0.0465	0.0240
Paid Employment	-0.0231	0.0494
Further Study	0.0387	0.0341
Others/Unknown/Overseas	-0.0621	0.0413
Other Health Studies (including Rehabilitation Therapies)		
Being on Benefit	0.0211*	0.0088
Paid Employment	-0.0121	0.0282
Further Study	0.0207*	0.0081

Others/Unknown/Overseas	-0.0296	0.0224
Philosophy		
Being on Benefit	0.0769***	0.0146
Paid Employment	-0.2051***	0.0355
Further Study	0.1040***	0.0203
Others/Unknown/Overseas	0.0242	0.0245
Physics		
Being on Benefit	0.0285	0.0212
Paid Employment	-0.2172***	0.0475
Further Study	0.1930***	0.0429
Others/Unknown/Overseas	-0.0043	0.0234
Political Science, International Relations and Public Policy		
Being on Benefit	0.0175*	0.0076
Paid Employment	-0.1028***	0.0257
Further Study	0.0442***	0.0129
Others/Unknown/Overseas	0.0411*	0.0180
Psychology		
Being on Benefit	0.0372***	0.0105
Paid Employment	-0.1180***	0.0265
Further Study	0.0871***	0.0133
Others/Unknown/Overseas	-0.0063	0.0209
Public Health		
Being on Benefit	0.1326***	0.0275
Paid Employment	-0.1975**	0.0652
Further Study	0.0565	0.0300
Others/Unknown/Overseas	0.0083	0.0336
Pure and Applied Mathematics		
Being on Benefit	0.0383**	0.0127
Paid Employment	-0.2245***	0.0293
Further Study	0.0990***	0.0202
Others/Unknown/Overseas	0.0871**	0.0320
Religious Studies and Theology		
Being on Benefit	0.0414	0.0252
Paid Employment	-0.1594***	0.0388
Further Study	0.0687	0.0416
Others/Unknown/Overseas	0.0493	0.0348
Sociology, Social Policy, Social Work, Criminology and Gender Studies		
Being on Benefit	0.0470***	0.0124
Paid Employment	-0.1165***	0.0273
Further Study	0.0393***	0.0114
Others/Unknown/Overseas	0.0302	0.0207
Sport and Exercise Science		
Being on Benefit	0.0075	0.0083
Paid Employment	0.0257	0.0299
Further Study	0.0017	0.0087

Others/Unknown/Overseas	-0.0349	0.0301
Statistics		
Being on Benefit	0.0082	0.0088
Paid Employment	-0.1802***	0.0233
Further Study	0.0919***	0.0162
Others/Unknown/Overseas	0.0801***	0.0221
Theatre and Dance, Film and Television and Multimedia		
Being on Benefit	0.0905***	0.0228
Paid Employment	-0.2261***	0.0506
Further Study	0.0393*	0.0181
Others/Unknown/Overseas	0.0962*	0.0416
Veterinary Studies and Large Animal Science		
Being on Benefit	0.0259**	0.0098
Paid Employment	-0.0017	0.0250
Further Study	0.0377***	0.0109
Others/Unknown/Overseas	-0.0618**	0.0231
Visual Arts and Crafts		
Being on Benefit	0.0356**	0.0130
Paid Employment	-0.1813***	0.0415
Further Study	0.0221	0.0117
Others/Unknown/Overseas	0.1236***	0.0363
Year fixed effects		
First year at the tertiary education institute of the student – 2008		
Being on Benefit	-0.0035	0.0025
Paid Employment	0.0207***	0.0064
Further Study	-0.0098**	0.0032
Others/Unknown/Overseas	-0.0073	0.0059
Number of observations	30,222	

Notes: (1) The dependent variable is the *labour market status* of the student. (2) Robust standard errors are clustered on the *id* (*id* is composed of evaluation year, university, and subject area) level. Standard error adjusted for 273 clusters in id. (3) The base outcome variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (4) The base outcome variable is male

student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. (5) I have estimated all the above coefficients by using university, subject area, and year fixed effects. (6) I am not allowed to identify specific universities due to 5.14.2 entity clause of Stats NZ. (7) * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$.

Appendix 4C: Marginal Effects of Multinomial Logit for Student's Gender

Table 4.C.1: Determinants of Labour Market Outcomes; Subsample Analysis Student's Gender – Male (Marginal Effects of Multinomial Logit)

	dy/dx	Standard Error
PBRF Outcomes		
Proportion of academics attaining PBRF rank A		
Being on Benefit	0.0002	0.0003
Paid Employment	-0.0012	0.0007
Further Study	0.0007	0.0005
Others/Unknown/Overseas	0.0003	0.0006
Proportion of academics attaining PBRF rank B		
Being on Benefit	0.0001	0.0002
Paid Employment	-0.0009	0.0005
Further Study	0.0006	0.0003
Others/Unknown/Overseas	0.0002	0.0004
Proportion of academics attaining PBRF rank C(NE)		
Being on Benefit	0.0002	0.0003
Paid Employment	-0.0005	0.0008
Further Study	0.0005	0.0005
Others/Unknown/Overseas	-0.0001	0.0006
Proportion of academics attaining PBRF rank R		
Being on Benefit	0.0003	0.0002
Paid Employment	-0.0013	0.0009
Further Study	0.0008	0.0005
Others/Unknown/Overseas	0.0003	0.0007
Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave		
Being on Benefit	-0.0001	0.0002
Paid Employment	-0.0020**	0.0008
Further Study	0.0003	0.0004
Others/Unknown/Overseas	0.0018**	0.0007
Department Level Characteristics		
Researcher's Position Title		
Proportion of Professors		
Being on Benefit	-0.0001	0.0003
Paid Employment	0.0013	0.0007
Further Study	-0.0009*	0.0004
Others/Unknown/Overseas	-0.0003	0.0006
Proportion of Associate Professors		
Being on Benefit	0.0006*	0.0003
Paid Employment	0.0007	0.0007
Further Study	-0.0014**	0.0004
Others/Unknown/Overseas	0.0002	0.0006

Proportion of Lecturers		
Being on Benefit	-0.0003	0.0002
Paid Employment	0.0008	0.0006
Further Study	-0.0002	0.0004
Others/Unknown/Overseas	-0.0004	0.0005
Proportion of Other Teaching Staff		
Being on Benefit	0.0001	0.0004
Paid Employment	0.0009	0.0010
Further Study	-0.0011	0.0006
Others/Unknown/Overseas	0.0000	0.0008
Proportion of Other Non-Teaching Staff		
Being on Benefit	-0.0001	0.0002
Paid Employment	-0.0002	0.0007
Further Study	-0.0003	0.0004
Others/Unknown/Overseas	0.0006	0.0006
Researcher's Gender		
Proportion of female academics		
Being on Benefit	0.0000	0.0002
Paid Employment	-0.0007	0.0005
Further Study	0.0002	0.0003
Others/Unknown/Overseas	0.0005	0.0004
Proportion of academics for whom gender is unknown		
Being on Benefit	0.0001	0.0003
Paid Employment	-0.0006	0.0010
Further Study	0.0001	0.0007
Others/Unknown/Overseas	0.0003	0.0007
Researcher's Age Band		
Proportion of academics in the age band of 20 to 29		
Being on Benefit	-0.0002	0.0007
Paid Employment	-0.0037*	0.0018
Further Study	0.0009	0.0011
Others/Unknown/Overseas	0.0030	0.0016
Proportion of academics in the age band of 40 to 49		
Being on Benefit	-0.0002	0.0002
Paid Employment	-0.0003	0.0006
Further Study	0.0001	0.0004
Others/Unknown/Overseas	0.0005	0.0005
Proportion of academics in the age band of 50 to 59		
Being on Benefit	-0.0002	0.0002
Paid Employment	0.0001	0.0006
Further Study	-0.0002	0.0004
Others/Unknown/Overseas	0.0003	0.0005
Proportion of academics in the age band of 60 to 69		
Being on Benefit	-0.0005	0.0003
Paid Employment	0.0000	0.0008
Further Study	0.0008	0.0006

Others/Unknown/Overseas	-0.0002	0.0006
Proportion of academics in the age band of 70 and Over		
Being on Benefit	-0.0001	0.0007
Paid Employment	-0.0029	0.0016
Further Study	0.0019	0.0014
Others/Unknown/Overseas	0.0012	0.0014
Proportion of academics for whom age band is unknown		
Being on Benefit	0.0001	0.0003
Paid Employment	0.0002	0.0009
Further Study	0.0001	0.0006
Others/Unknown/Overseas	-0.0004	0.0005
Researcher's Ethnicity		
Proportion of Asian academics		
Being on Benefit	-0.0003	0.0003
Paid Employment	0.0007	0.0007
Further Study	0.0001	0.0005
Others/Unknown/Overseas	-0.0005	0.0006
Proportion of Māori academics		
Being on Benefit	0.0002	0.0003
Paid Employment	-0.0016*	0.0007
Further Study	0.0003	0.0006
Others/Unknown/Overseas	0.0012*	0.0006
Proportion of Pasifika academics		
Being on Benefit	-0.0005	0.0007
Paid Employment	0.0022	0.0020
Further Study	-0.0012	0.0014
Others/Unknown/Overseas	-0.0005	0.0014
Proportion of Middle Eastern/Latin American/African academics		
Being on Benefit	0.0010	0.0010
Paid Employment	-0.0051*	0.0020
Further Study	0.0019	0.0016
Others/Unknown/Overseas	0.0022	0.0021
Proportion of academics belonging to "other ethnicity"		
Being on Benefit	0.0002	0.0002
Paid Employment	-0.0010	0.0006
Further Study	0.0004	0.0003
Others/Unknown/Overseas	0.0004	0.0005
Proportion of academics for whom ethnicity is unknown		
Being on Benefit	-0.0004*	0.0001
Paid Employment	-0.0001	0.0005
Further Study	0.0002	0.0003
Others/Unknown/Overseas	0.0003	0.0004

Student Level Characteristics

Student's ethnicity

Asian student		
Being on Benefit	0.0067	0.0055
Paid Employment	-0.1543***	0.0138
Further Study	0.0358***	0.0088
Others/Unknown/Overseas	0.1117***	0.0096
Māori student		
Being on Benefit	0.0101	0.0083
Paid Employment	-0.088***	0.0228
Further Study	0.0489***	0.0145
Others/Unknown/Overseas	0.029	0.0187
Pasifika student		
Being on Benefit	0.0262**	0.0099
Paid Employment	-0.0882**	0.0308
Further Study	0.0131	0.0188
Others/Unknown/Overseas	0.049*	0.0224
Middle Eastern/Latin American/African student		
Being on Benefit	0.0337*	0.0165
Paid Employment	-0.2300***	0.0457
Further Study	0.0599*	0.0241
Others/Unknown/Overseas	0.1363***	0.0306
Student belonging to "other ethnicity"		
Being on Benefit	0.0244*	0.0103
Paid Employment	-0.1216***	0.0267
Further Study	0.0099	0.0160
Others/Unknown/Overseas	0.0874***	0.0208
Student for whom ethnicity is unknown		
Being on Benefit	0.0011	0.0235
Paid Employment	-0.1091	0.0595
Further Study	-0.0023	0.0357
Others/Unknown/Overseas	0.1102*	0.0436
Student's high school decile		
School decile 1		
Being on Benefit	0.0027	0.0141
Paid Employment	0.0306	0.0402
Further Study	0.0147	0.0252
Others/Unknown/Overseas	-0.0480	0.0293
School decile 2		
Being on Benefit	0.0106	0.0106
Paid Employment	-0.0072	0.0312
Further Study	-0.0132	0.0202
Others/Unknown/Overseas	0.0098	0.0261
School decile 3		
Being on Benefit	-0.0081	0.0101
Paid Employment	0.0038	0.0256
Further Study	0.0086	0.0151
Others/Unknown/Overseas	-0.0042	0.0203

School decile 4		
Being on Benefit	-0.0039	0.0092
Paid Employment	0.0173	0.0237
Further Study	-0.0116	0.0150
Others/Unknown/Overseas	-0.0018	0.0186
School decile 6		
Being on Benefit	-0.0002	0.0084
Paid Employment	0.0284	0.0215
Further Study	-0.0190	0.0138
Others/Unknown/Overseas	-0.0092	0.0172
School decile 7		
Being on Benefit	-0.0091	0.0086
Paid Employment	-0.0269	0.0215
Further Study	0.0082	0.0129
Others/Unknown/Overseas	0.0278	0.0170
School decile 8		
Being on Benefit	-0.0144	0.0081
Paid Employment	0.0146	0.0230
Further Study	-0.0075	0.0136
Others/Unknown/Overseas	0.0072	0.0174
School decile 9		
Being on Benefit	-0.0034	0.0077
Paid Employment	-0.0148	0.0203
Further Study	0.0029	0.0124
Others/Unknown/Overseas	0.0152	0.0174
School decile 10		
Being on Benefit	-0.0307***	0.0084
Paid Employment	0.0027	0.0187
Further Study	-0.0009	0.0119
Others/Unknown/Overseas	0.0288	0.0157
School decile missing		
Being on Benefit	-0.0220	0.0339
Paid Employment	-0.0042	0.0552
Further Study	0.0049	0.0403
Others/Unknown/Overseas	0.0214	0.0420
Level of NCEA achieved by the student		
Achieved less than NCEA level 3		
Being on Benefit	0.0196***	0.0041
Paid Employment	-0.0535***	0.0109
Further Study	0.0248***	0.0067
Others/Unknown/Overseas	0.0090	0.0088
Overseas equivalent to NCEA level 3		
Being on Benefit	-0.0372**	0.0134
Paid Employment	0.0224	0.0245
Further Study	-0.0160	0.0126

Others/Unknown/Overseas	0.0308*	0.0120
Missing observations on NCEA level achieved		
Being on Benefit	0.0154	0.0124
Paid Employment	-0.0955**	0.0364
Further Study	0.0335	0.0199
Others/Unknown/Overseas	0.0466	0.0319
University fixed effects		
University 1		
University 2		
Being on Benefit	-0.0294*	0.0120
Paid Employment	0.0666	0.0424
Further Study	-0.0312	0.0317
Others/Unknown/Overseas	-0.0061	0.0263
University 3		
Being on Benefit	0.0144	0.0133
Paid Employment	0.0060	0.0227
Further Study	-0.0121	0.0195
Others/Unknown/Overseas	-0.0083	0.0164
University 4		
Being on Benefit	-0.0159	0.0111
Paid Employment	0.0184	0.0224
Further Study	-0.0268	0.0174
Others/Unknown/Overseas	0.0244	0.0169
University 5		
Being on Benefit	-0.0104	0.0114
Paid Employment	-0.0105	0.0256
Further Study	-0.0238	0.0188
Others/Unknown/Overseas	0.0447*	0.0190
University 6		
Being on Benefit	0.0210	0.0123
Paid Employment	-0.0665**	0.0237
Further Study	-0.0196	0.0190
Others/Unknown/Overseas	0.0651***	0.0179
University 7		
Being on Benefit	0.0120	0.0110
Paid Employment	-0.0353	0.0237
Further Study	-0.0300	0.0198
Others/Unknown/Overseas	0.0533**	0.0203
University 8		
Being on Benefit	0.0115	0.0143
Paid Employment	-0.0031	0.0339
Further Study	-0.0523**	0.0202
Others/Unknown/Overseas	0.0439	0.0303
Subject area fixed effects		

Accounting and Finance		
Agriculture and Other Applied Biological Sciences		
Being on Benefit	0.0045	0.0157
Paid Employment	-0.0005	0.0420
Further Study	0.0100	0.0217
Others/Unknown/Overseas	-0.014	0.0333
Anthropology and Archaeology		
Being on Benefit	0.0728*	0.0321
Paid Employment	-0.0988	0.0566
Further Study	0.0746	0.0394
Others/Unknown/Overseas	-0.0486	0.0354
Architecture, Design, Planning, Surveying		
Being on Benefit	0.0153	0.0150
Paid Employment	-0.0676*	0.0333
Further Study	0.0209	0.0235
Others/Unknown/Overseas	0.0314	0.0384
Biomedical		
Being on Benefit	0.0171	0.0463
Paid Employment	-0.0584	0.0806
Further Study	0.1080	0.0566
Others/Unknown/Overseas	-0.0667	0.0669
Chemistry		
Being on Benefit	0.0238	0.0189
Paid Employment	-0.1478**	0.0489
Further Study	0.1867***	0.0577
Others/Unknown/Overseas	-0.0627	0.0477
Clinical Medicine		
Being on Benefit	-0.029***	0.0089
Paid Employment	0.1826***	0.0234
Further Study	0.0241	0.0187
Others/Unknown/Overseas	-0.1777***	0.0166
Communications, Journalism and Media Studies		
Being on Benefit	0.0286	0.0181
Paid Employment	-0.0213	0.0326
Further Study	0.0003	0.0227
Others/Unknown/Overseas	-0.0075	0.0321
Computer Science, Information Technology, Information Sciences		
Being on Benefit	0.0196	0.0117
Paid Employment	0.0011	0.0294
Further Study	0.0254	0.0191
Others/Unknown/Overseas	-0.0462	0.0259
Dentistry		
Being on Benefit	0.0275	0.0189
Paid Employment	0.1004***	0.0313
Further Study	-0.0173	0.0190

Others/Unknown/Overseas	-0.1106***	0.0325
Design		
Being on Benefit	0.0385*	0.0173
Paid Employment	-0.1317***	0.0344
Further Study	-0.0038	0.0237
Others/Unknown/Overseas	0.0971*	0.0424
Earth Sciences		
Being on Benefit	0.0233	0.0153
Paid Employment	-0.1125***	0.0328
Further Study	0.0277	0.0252
Others/Unknown/Overseas	0.0614*	0.0307
Ecology, Evolution and Behaviour		
Being on Benefit	0.0491*	0.0218
Paid Employment	-0.0646	0.0354
Further Study	0.0803*	0.0319
Others/Unknown/Overseas	-0.0648*	0.0289
Economics		
Being on Benefit	-0.0085	0.0083
Paid Employment	-0.0723**	0.0242
Further Study	0.0199	0.0169
Others/Unknown/Overseas	0.0608***	0.0180
Education		
Being on Benefit	0.0308	0.0183
Paid Employment	0.0951**	0.0340
Further Study	-0.0129	0.0196
Others/Unknown/Overseas	-0.113***	0.0216
Engineering and Technology		
Being on Benefit	0.0050	0.0140
Paid Employment	-0.0285	0.0369
Further Study	0.0073	0.0219
Others/Unknown/Overseas	0.0162	0.0311
English Language and Literature		
Being on Benefit	0.0744***	0.0212
Paid Employment	-0.0732*	0.0363
Further Study	0.0124	0.0267
Others/Unknown/Overseas	-0.0136	0.0316
Foreign Languages and Linguistics		
Being on Benefit	0.0406*	0.0184
Paid Employment	-0.1816***	0.0325
Further Study	0.0770**	0.0270
Others/Unknown/Overseas	0.0640*	0.0267
History, History of Art, Classics and Curatorial Studies		
Being on Benefit	0.0802***	0.0185
Paid Employment	-0.1376***	0.0329
Further Study	0.0698**	0.0249

Others/Unknown/Overseas	-0.0124	0.0224
Human Geography		
Being on Benefit	0.0736	0.0441
Paid Employment	-0.1632***	0.0469
Further Study	0.0030	0.0349
Others/Unknown/Overseas	0.0866*	0.0408
Law		
Being on Benefit	0.0094	0.0122
Paid Employment	0.0284	0.0287
Further Study	0.0484*	0.0204
Others/Unknown/Overseas	-0.0862***	0.0201
Management, Human Resources, Industrial Relations, International Business and Other Business		
Being on Benefit	0.0050	0.0102
Paid Employment	-0.0345	0.0249
Further Study	0.0005	0.0173
Others/Unknown/Overseas	0.0290	0.0197
Marketing and Tourism		
Being on Benefit	0.0082	0.0107
Paid Employment	-0.0528	0.0317
Further Study	-0.0274	0.0156
Others/Unknown/Overseas	0.0720*	0.0296
Molecular, Cellular and Whole Organism Biology		
Being on Benefit	0.0244	0.0154
Paid Employment	-0.1825***	0.0377
Further Study	0.1098**	0.0349
Others/Unknown/Overseas	0.0484	0.0428
Music, Literary Arts and Other Arts		
Being on Benefit	0.0928***	0.0250
Paid Employment	-0.1549***	0.0368
Further Study	0.0380	0.0280
Others/Unknown/Overseas	0.0241	0.0323
Māori Knowledge and Development		
Being on Benefit	0.0465	0.0367
Paid Employment	0.0722	0.0574
Further Study	0.004	0.0515
Others/Unknown/Overseas	-0.1227***	0.0304
Other Health Studies (including Rehabilitation Therapies)		
Being on Benefit	0.0145	0.0133
Paid Employment	0.0537	0.0284
Further Study	0.0112	0.0196
Others/Unknown/Overseas	-0.0793***	0.0219
Philosophy		
Being on Benefit	0.0837***	0.0200
Paid Employment	-0.1972***	0.0402
Further Study	0.1515***	0.0352

Others/Unknown/Overseas	-0.038	0.0345
Physics		
Being on Benefit	0.0052	0.0171
Paid Employment	-0.1728***	0.0484
Further Study	0.1592**	0.0567
Others/Unknown/Overseas	0.0084	0.0333
Political Science, International Relations and Public Policy		
Being on Benefit	0.0169	0.0116
Paid Employment	-0.0324	0.0279
Further Study	0.0264	0.0213
Others/Unknown/Overseas	-0.0109	0.0256
Psychology		
Being on Benefit	0.0504***	0.0143
Paid Employment	-0.0340	0.0333
Further Study	0.0259	0.0241
Others/Unknown/Overseas	-0.0423	0.0250
Public Health		
Being on Benefit	0.1270*	0.0586
Paid Employment	-0.2082*	0.1038
Further Study	0.1681*	0.0701
Others/Unknown/Overseas	-0.0869*	0.0377
Pure and Applied Mathematics		
Being on Benefit	0.0297*	0.0123
Paid Employment	-0.1719***	0.0337
Further Study	0.0756*	0.0328
Others/Unknown/Overseas	0.0666*	0.0280
Religious Studies and Theology		
Being on Benefit	0.0433	0.0332
Paid Employment	-0.2427***	0.0664
Further Study	0.0923	0.0565
Others/Unknown/Overseas	0.1071	0.0846
Sociology, Social Policy, Social Work, Criminology and Gender Studies		
Being on Benefit	0.0949***	0.0193
Paid Employment	-0.0985***	0.0294
Further Study	0.0329	0.0225
Others/Unknown/Overseas	-0.0294	0.0231
Sport and Exercise Science		
Being on Benefit	-0.0027	0.0130
Paid Employment	0.0455	0.0301
Further Study	-0.0125	0.0191
Others/Unknown/Overseas	-0.0303	0.0293
Statistics		
Being on Benefit	0.0064	0.0126
Paid Employment	-0.1779***	0.0355
Further Study	0.1303***	0.0326

Others/Unknown/Overseas	0.0412	0.0314
Theatre and Dance, Film and Television and Multimedia		
Being on Benefit	0.1524***	0.0468
Paid Employment	-0.1555	0.0833
Further Study	-0.0111	0.0438
Others/Unknown/Overseas	0.0143	0.0428
Veterinary Studies and Large Animal Science		
Being on Benefit	-0.037***	0.0077
Paid Employment	0.0828	0.0506
Further Study	-0.0039	0.0263
Others/Unknown/Overseas	-0.0419	0.0437
Visual Arts and Crafts		
Being on Benefit	0.0784*	0.0365
Paid Employment	-0.1448***	0.0439
Further Study	0.0279	0.0258
Others/Unknown/Overseas	0.0385	0.0330
Year fixed effects		
First year at the tertiary education institute of the student – 1999		
Being on Benefit	-0.0266***	0.0066
Paid Employment	0.013	0.0184
Further Study	-0.0461***	0.0101
Others/Unknown/Overseas	0.0597***	0.0169
First year at the tertiary education institute of the student – 2007		
Being on Benefit	-0.0577***	0.0101
Paid Employment	-0.0324	0.0351
Further Study	-0.077***	0.0181
Others/Unknown/Overseas	0.1672***	0.0305
First year at the tertiary education institute of the student – 2008		
Being on Benefit	-0.0633***	0.0101
Paid Employment	-0.0014	0.0349
Further Study	-0.0866***	0.0183

Others/Unknown/Overseas	0.1513***	0.0305
Number of observations	16,116	

Notes: (1) The dependent variable is the *labour market status* of the student. (2) Robust standard errors are clustered on the *id* (*id* is composed of evaluation year, university, and subject area) level. Standard error adjusted for 498 clusters in id. (3) The base outcome variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (4) The base outcome variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. (5) I have estimated all the above coefficients by using university, subject area, and year fixed effects. (6) I am not allowed to identify specific universities due to 5.14.2 entity clause of Stats NZ. (7) * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$.

Table 4.C.2: Determinants of Labour Market Outcomes; Subsample Analysis Student's Gender – Female (Marginal Effects of Multinomial Logit)

	dy/dx	Standard Error
PBRF Outcomes		
Proportion of academics attaining PBRF rank A		
Being on Benefit	-0.0001	0.0003
Paid Employment	0.0002	0.0008
Further Study	0.0001	0.0004
Others/Unknown/Overseas	-0.0001	0.0007
Proportion of academics attaining PBRF rank B		
Being on Benefit	0.0004**	0.0001
Paid Employment	0.0000	0.0004
Further Study	-0.0002	0.0002
Others/Unknown/Overseas	-0.0002	0.0003
Proportion of academics attaining PBRF rank C(NE)		
Being on Benefit	0.0002	0.0002
Paid Employment	0.0007	0.0007
Further Study	-0.0003	0.0005
Others/Unknown/Overseas	-0.0006	0.0006
Proportion of academics attaining PBRF rank R		
Being on Benefit	0.0006**	0.0002
Paid Employment	-0.0009	0.0008
Further Study	0.0010**	0.0004
Others/Unknown/Overseas	-0.0007	0.0007
Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave		
Being on Benefit	-0.0001	0.0002
Paid Employment	-0.0016*	0.0007
Further Study	0.0012***	0.0003
Others/Unknown/Overseas	0.0005	0.0007
Department Level Characteristics		
Researcher's Position Title		
Proportion of Professors		
Being on Benefit	-0.0001	0.0003
Paid Employment	0.0002	0.0007
Further Study	-0.0002	0.0004
Others/Unknown/Overseas	0.0000	0.0006
Proportion of Associate Professors		
Being on Benefit	0.0002	0.0002
Paid Employment	-0.0013	0.0007
Further Study	0.0007*	0.0003
Others/Unknown/Overseas	0.0003	0.0006
Proportion of Lecturers		
Being on Benefit	0.0005*	0.0002
Paid Employment	0.0005	0.0005

Further Study	0.0001	0.0003
Others/Unknown/Overseas	-0.0011*	0.0005
Proportion of Other Teaching Staff		
Being on Benefit	-0.0002	0.0003
Paid Employment	0.0009	0.0009
Further Study	0.0007*	0.0003
Others/Unknown/Overseas	-0.0013	0.0008
Proportion of Other Non-Teaching Staff		
Being on Benefit	0.0002	0.0002
Paid Employment	-0.0013*	0.0007
Further Study	0.0003	0.0003
Others/Unknown/Overseas	0.0009	0.0005
Researcher's Gender		
Proportion of female academics		
Being on Benefit	0.0002	0.0002
Paid Employment	-0.0007	0.0004
Further Study	-0.0001	0.0002
Others/Unknown/Overseas	0.0006	0.0004
Proportion of academics for whom gender is unknown		
Being on Benefit	-0.0004	0.0003
Paid Employment	-0.0012	0.0009
Further Study	0.0010*	0.0005
Others/Unknown/Overseas	0.0006	0.0009
Researcher's Age Band		
Proportion of academics in the age band of 20 to 29		
Being on Benefit	-0.0001	0.0006
Paid Employment	-0.0023	0.0015
Further Study	-0.0011	0.0007
Others/Unknown/Overseas	0.0035**	0.0013
Proportion of academics in the age band of 40 to 49		
Being on Benefit	0.0003	0.0002
Paid Employment	0.0005	0.0005
Further Study	-0.0004	0.0003
Others/Unknown/Overseas	-0.0004	0.0005
Proportion of academics in the age band of 50 to 59		
Being on Benefit	0.0001	0.0002
Paid Employment	0.0002	0.0006
Further Study	-0.0001	0.0003
Others/Unknown/Overseas	-0.0002	0.0005
Proportion of academics in the age band of 60 to 69		
Being on Benefit	0.0003	0.0003
Paid Employment	0.0013	0.0008
Further Study	-0.0005	0.0004
Others/Unknown/Overseas	-0.0011	0.0007
Proportion of academics in the age band of 70 and Over		

Being on Benefit	0.0002	0.0006
Paid Employment	-0.0021	0.0021
Further Study	0.0019*	0.0008
Others/Unknown/Overseas	0.0000	0.0018
Proportion of academics for whom age band is unknown		
Being on Benefit	0.0005	0.0003
Paid Employment	0.0007	0.0008
Further Study	-0.0007	0.0004
Others/Unknown/Overseas	-0.0005	0.0008
Researcher's Ethnicity		
Proportion of Asian academics		
Being on Benefit	0.0002	0.0003
Paid Employment	-0.0005	0.0008
Further Study	0.0006	0.0004
Others/Unknown/Overseas	-0.0003	0.0006
Proportion of Māori academics		
Being on Benefit	-0.0001	0.0002
Paid Employment	-0.0017*	0.0007
Further Study	0.0002	0.0004
Others/Unknown/Overseas	0.0015*	0.0006
Proportion of Pasifika academics		
Being on Benefit	0.0001	0.0007
Paid Employment	0.0009	0.0018
Further Study	-0.0003	0.0009
Others/Unknown/Overseas	-0.0007	0.0015
Proportion of Middle Eastern/Latin American/African academics		
Being on Benefit	0.0000	0.0009
Paid Employment	-0.0019	0.0019
Further Study	0.0013	0.0013
Others/Unknown/Overseas	0.0006	0.0013
Proportion of academics belonging to "other ethnicity"		
Being on Benefit	0.0001	0.0002
Paid Employment	-0.0013*	0.0006
Further Study	0.0006*	0.0003
Others/Unknown/Overseas	0.0006	0.0005
Proportion of academics for whom ethnicity is unknown		
Being on Benefit	0.0002	0.0001
Paid Employment	-0.0001	0.0004
Further Study	0.0000	0.0002
Others/Unknown/Overseas	0.0000	0.0004

Student Level Characteristics

Student's ethnicity

Asian student		
Being on Benefit	-0.0093	0.0051
Paid Employment	-0.1137***	0.0128
Further Study	0.0320***	0.0068
Others/Unknown/Overseas	0.0910***	0.0120
Māori student		
Being on Benefit	0.0289***	0.0058
Paid Employment	-0.0501**	0.0177
Further Study	0.0372***	0.0081
Others/Unknown/Overseas	-0.0159	0.0166
Pasifika student		
Being on Benefit	0.0322***	0.0063
Paid Employment	-0.0995***	0.0219
Further Study	0.0454***	0.0102
Others/Unknown/Overseas	0.0218	0.0197
Middle Eastern/Latin American/African student		
Being on Benefit	0.0391**	0.0130
Paid Employment	-0.2067***	0.0390
Further Study	0.0444*	0.0175
Others/Unknown/Overseas	0.1232***	0.0313
Student belonging to "other ethnicity"		
Being on Benefit	0.0083	0.0108
Paid Employment	-0.0869***	0.0224
Further Study	0.0180	0.0125
Others/Unknown/Overseas	0.0607***	0.0189
Student for whom ethnicity is unknown		
Being on Benefit	0.0162	0.0184
Paid Employment	-0.0942*	0.0444
Further Study	-0.0183	0.0287
Others/Unknown/Overseas	0.0963**	0.0332
Student's high school decile		
School decile 1		
Being on Benefit	-0.0010	0.0096
Paid Employment	0.0611*	0.0282
Further Study	-0.0019	0.0144
Others/Unknown/Overseas	-0.0583	0.0298
School decile 2		
Being on Benefit	0.0005	0.0098
Paid Employment	-0.0014	0.0257
Further Study	0.0078	0.0131
Others/Unknown/Overseas	-0.0068	0.0233
School decile 3		
Being on Benefit	0.0014	0.0069
Paid Employment	0.0108	0.0176
Further Study	0.0120	0.0096
Others/Unknown/Overseas	-0.0241	0.0175

School decile 4		
Being on Benefit	-0.0008	0.0083
Paid Employment	0.0187	0.0189
Further Study	0.0038	0.0106
Others/Unknown/Overseas	-0.0218	0.0157
School decile 6		
Being on Benefit	0.0004	0.0069
Paid Employment	0.0242	0.0150
Further Study	-0.0004	0.0088
Others/Unknown/Overseas	-0.0242	0.0154
School decile 7		
Being on Benefit	-0.0071	0.0070
Paid Employment	0.0015	0.0149
Further Study	0.0012	0.0085
Others/Unknown/Overseas	0.0044	0.0131
School decile 8		
Being on Benefit	-0.0041	0.0072
Paid Employment	0.0064	0.0164
Further Study	-0.0018	0.0095
Others/Unknown/Overseas	-0.0005	0.0146
School decile 9		
Being on Benefit	-0.0148*	0.0075
Paid Employment	0.0077	0.0157
Further Study	0.0028	0.0084
Others/Unknown/Overseas	0.0042	0.0136
School decile 10		
Being on Benefit	-0.0273***	0.0074
Paid Employment	0.0131	0.0156
Further Study	-0.0025	0.0089
Others/Unknown/Overseas	0.0166	0.0145
School decile missing		
Being on Benefit	0.0123	0.0153
Paid Employment	-0.0573	0.0396
Further Study	0.0293	0.0178
Others/Unknown/Overseas	0.0156	0.0384
Level of NCEA achieved by the student		
Achieved less than NCEA level 3		
Being on Benefit	0.0253***	0.0037
Paid Employment	-0.0521***	0.0096
Further Study	0.0204***	0.0056
Others/Unknown/Overseas	0.0065	0.0082
Overseas equivalent to NCEA level 3		
Being on Benefit	-0.0108	0.0142
Paid Employment	-0.0521*	0.0250
Further Study	0.0073	0.0123

Others/Unknown/Overseas	0.0556**	0.0183
Missing observations on NCEA level achieved		
Being on Benefit	0.0106	0.0105
Paid Employment	-0.0595	0.0308
Further Study	0.0232	0.0146
Others/Unknown/Overseas	0.0257	0.0274
University fixed effects		
University 1		
University 2		
Being on Benefit	-0.0263	0.0165
Paid Employment	0.0433	0.0336
Further Study	-0.0512***	0.0120
Others/Unknown/Overseas	0.0343	0.0264
University 3		
Being on Benefit	-0.0221*	0.0109
Paid Employment	0.0166	0.0292
Further Study	-0.0123	0.0127
Others/Unknown/Overseas	0.0179	0.0202
University 4		
Being on Benefit	-0.0156	0.0111
Paid Employment	0.0334	0.0329
Further Study	-0.0258*	0.0110
Others/Unknown/Overseas	0.0080	0.0223
University 5		
Being on Benefit	-0.0146	0.0105
Paid Employment	0.0002	0.0320
Further Study	-0.0105	0.0127
Others/Unknown/Overseas	0.0248	0.0223
University 6		
Being on Benefit	0.0032	0.0122
Paid Employment	-0.0284	0.0334
Further Study	0.0001	0.0120
Others/Unknown/Overseas	0.0252	0.0233
University 7		
Being on Benefit	0.0017	0.0099
Paid Employment	-0.0246	0.0316
Further Study	0.0028	0.0118
Others/Unknown/Overseas	0.0201	0.0229
University 8		
Being on Benefit	-0.0277*	0.0113
Paid Employment	-0.0342	0.0365
Further Study	0.0043	0.0170
Others/Unknown/Overseas	0.0577	0.0302
Subject area fixed effects		

Accounting and Finance		
Agriculture and Other Applied Biological Sciences		
Being on Benefit	0.0293*	0.0137
Paid Employment	-0.0988**	0.0366
Further Study	0.1093***	0.0272
Others/Unknown/Overseas	-0.0397	0.0244
Anthropology and Archaeology		
Being on Benefit	0.0525*	0.0258
Paid Employment	-0.1759***	0.0474
Further Study	0.0664***	0.0172
Others/Unknown/Overseas	0.0570	0.0425
Architecture, Design, Planning, Surveying		
Being on Benefit	0.0429***	0.0101
Paid Employment	-0.1526***	0.0310
Further Study	0.0291*	0.0140
Others/Unknown/Overseas	0.0807***	0.0239
Biomedical		
Being on Benefit	-0.0063	0.0114
Paid Employment	0.0344	0.0639
Further Study	0.0545	0.0373
Others/Unknown/Overseas	-0.0826	0.0570
Chemistry		
Being on Benefit	0.0338*	0.0170
Paid Employment	-0.1922***	0.0588
Further Study	0.1626***	0.0470
Others/Unknown/Overseas	-0.0041	0.0354
Clinical Medicine		
Being on Benefit	-0.0188**	0.0061
Paid Employment	0.0837	0.0529
Further Study	0.0745*	0.0302
Others/Unknown/Overseas	-0.1394***	0.0256
Communications, Journalism and Media Studies		
Being on Benefit	0.0165	0.0113
Paid Employment	-0.1447***	0.0349
Further Study	-0.0033	0.0079
Others/Unknown/Overseas	0.1315***	0.0323
Computer Science, Information Technology, Information Sciences		
Being on Benefit	0.0008	0.0129
Paid Employment	-0.0709	0.0415
Further Study	0.0310	0.0162
Others/Unknown/Overseas	0.0391	0.0365
Dentistry		
Being on Benefit	0.0479**	0.0157
Paid Employment	-0.0889*	0.0386
Further Study	0.0041	0.0094

Others/Unknown/Overseas	0.0369	0.0326
Design		
Being on Benefit	0.0198	0.0117
Paid Employment	-0.1875***	0.0418
Further Study	0.0004	0.0082
Others/Unknown/Overseas	0.1673***	0.0374
Earth Sciences		
Being on Benefit	0.0219	0.0131
Paid Employment	-0.1856***	0.0371
Further Study	0.0778*	0.0332
Others/Unknown/Overseas	0.0860**	0.0311
Ecology, Evolution and Behaviour		
Being on Benefit	0.0542**	0.0176
Paid Employment	-0.1359***	0.0371
Further Study	0.0608**	0.0215
Others/Unknown/Overseas	0.0210	0.0316
Economics		
Being on Benefit	0.0260	0.0153
Paid Employment	-0.1549***	0.0374
Further Study	0.0211	0.0131
Others/Unknown/Overseas	0.1078**	0.0341
Education		
Being on Benefit	0.0341***	0.0096
Paid Employment	-0.0432	0.0326
Further Study	0.0273**	0.0097
Others/Unknown/Overseas	-0.0182	0.0260
Engineering and Technology		
Being on Benefit	0.0125	0.0262
Paid Employment	-0.1080	0.0699
Further Study	0.0192	0.0338
Others/Unknown/Overseas	0.0762	0.0597
English Language and Literature		
Being on Benefit	0.0511***	0.0147
Paid Employment	-0.1732***	0.0362
Further Study	0.0970***	0.0226
Others/Unknown/Overseas	0.0252	0.0313
Foreign Languages and Linguistics		
Being on Benefit	0.0128	0.0124
Paid Employment	-0.2183***	0.0305
Further Study	0.0805***	0.0139
Others/Unknown/Overseas	0.1249***	0.0266
History, History of Art, Classics and Curatorial Studies		
Being on Benefit	0.0387***	0.0113
Paid Employment	-0.1231***	0.0278
Further Study	0.0691***	0.0136

Others/Unknown/Overseas	0.0152	0.0264
Human Geography		
Being on Benefit	0.0202	0.0307
Paid Employment	-0.1439*	0.0648
Further Study	0.0708	0.0394
Others/Unknown/Overseas	0.0530	0.0426
Law		
Being on Benefit	0.0209**	0.0072
Paid Employment	-0.0243	0.0276
Further Study	0.0456***	0.0103
Others/Unknown/Overseas	-0.0421	0.0228
Management, Human Resources, Industrial Relations, International Business and Other Business		
Being on Benefit	0.0124	0.0076
Paid Employment	-0.0985***	0.0287
Further Study	0.0076	0.0064
Others/Unknown/Overseas	0.0786**	0.0252
Marketing and Tourism		
Being on Benefit	0.0068	0.0055
Paid Employment	-0.1270***	0.0276
Further Study	0.0035	0.0063
Others/Unknown/Overseas	0.1167***	0.0267
Molecular, Cellular and Whole Organism Biology		
Being on Benefit	0.0338*	0.0139
Paid Employment	-0.1782***	0.0373
Further Study	0.0773***	0.0182
Others/Unknown/Overseas	0.0672*	0.0332
Music, Literary Arts and Other Arts		
Being on Benefit	0.0765***	0.0207
Paid Employment	-0.2835***	0.0417
Further Study	0.0624*	0.0288
Others/Unknown/Overseas	0.1446***	0.0414
Māori Knowledge and Development		
Being on Benefit	0.0970*	0.0392
Paid Employment	-0.0918	0.0705
Further Study	0.0507	0.0406
Others/Unknown/Overseas	-0.0559	0.0495
Other Health Studies (including Rehabilitation Therapies)		
Being on Benefit	0.0159	0.0081
Paid Employment	-0.0221	0.0332
Further Study	0.0261**	0.0084
Others/Unknown/Overseas	-0.0199	0.0280
Philosophy		
Being on Benefit	0.0717***	0.0210
Paid Employment	-0.2223***	0.0563
Further Study	0.0516	0.0341

Others/Unknown/Overseas	0.0990*	0.0423
Physics		
Being on Benefit	0.1267***	0.0388
Paid Employment	-0.2465*	0.1064
Further Study	0.1617*	0.0790
Others/Unknown/Overseas	-0.0420	0.0464
Political Science, International Relations and Public Policy		
Being on Benefit	0.0185	0.0100
Paid Employment	-0.1451***	0.0362
Further Study	0.0431***	0.0115
Others/Unknown/Overseas	0.0835**	0.0306
Psychology		
Being on Benefit	0.0434***	0.0090
Paid Employment	-0.1520***	0.0341
Further Study	0.1029***	0.0148
Others/Unknown/Overseas	0.0057	0.0279
Public Health		
Being on Benefit	0.0921**	0.0310
Paid Employment	-0.1495*	0.0629
Further Study	0.0406	0.0220
Others/Unknown/Overseas	0.0167	0.0367
Pure and Applied Mathematics		
Being on Benefit	0.0029	0.0202
Paid Employment	-0.1553***	0.0409
Further Study	0.0489	0.0300
Others/Unknown/Overseas	0.1034	0.0542
Religious Studies and Theology		
Being on Benefit	0.0285	0.0220
Paid Employment	-0.1316**	0.0422
Further Study	0.0692**	0.0218
Others/Unknown/Overseas	0.0338	0.0325
Sociology, Social Policy, Social Work, Criminology and Gender Studies		
Being on Benefit	0.0394***	0.0111
Paid Employment	-0.1309***	0.0317
Further Study	0.0462***	0.0120
Others/Unknown/Overseas	0.0453	0.0276
Sport and Exercise Science		
Being on Benefit	0.0110	0.0130
Paid Employment	-0.0084	0.0422
Further Study	-0.0055	0.0148
Others/Unknown/Overseas	0.0028	0.0330
Statistics		
Being on Benefit	0.0386	0.0218
Paid Employment	-0.1927***	0.0364
Further Study	0.0518***	0.0142

Others/Unknown/Overseas	0.1023**	0.0327
Theatre and Dance, Film and Television and Multimedia		
Being on Benefit	0.1041***	0.0286
Paid Employment	-0.2744***	0.0725
Further Study	0.0635	0.0368
Others/Unknown/Overseas	0.1068*	0.0538
Veterinary Studies and Large Animal Science		
Being on Benefit	0.0483***	0.0126
Paid Employment	-0.0185	0.0308
Further Study	0.0492***	0.0147
Others/Unknown/Overseas	-0.079**	0.0254
Visual Arts and Crafts		
Being on Benefit	0.0588***	0.0137
Paid Employment	-0.2551***	0.0571
Further Study	0.0413*	0.0180
Others/Unknown/Overseas	0.1550**	0.0516
Year fixed effects		
First year at the tertiary education institute of the student – 1999		
Being on Benefit	-0.0287***	0.0045
Paid Employment	0.0517*	0.0217
Further Study	-0.0229**	0.0086
Others/Unknown/Overseas	-0.0001	0.0234
First year at the tertiary education institute of the student – 2007		
Being on Benefit	-0.0767***	0.0098
Paid Employment	0.0018	0.0322
Further Study	-0.0036	0.0140
Others/Unknown/Overseas	0.0785*	0.0312
First year at the tertiary education institute of the student – 2008		
Being on Benefit	-0.0797***	0.0097
Paid Employment	0.0143	0.0319
Further Study	-0.0145	0.0141

Others/Unknown/Overseas	0.0800**	0.0310
Number of observations	21,228	

Notes: (1) The dependent variable is the *labour market status* of the student. (2) Robust standard errors are clustered on the *id* (*id* is composed of evaluation year, university, and subject area) level. Standard error adjusted for 502 clusters in id. (3) The base outcome variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (4) The base outcome variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. (5) I have estimated all the above coefficients by using university, subject area, and year fixed effects. (6) I am not allowed to identify specific universities due to 5.14.2 entity clause of Stats NZ. (7) * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$.

Appendix 4D: Marginal Effects of Multinomial Logit for Student's Ethnicity

Table 4.D.1: Determinants of Labour Market Outcomes; Subsample Analysis Student's Ethnicity – NZ European/Pākehā (Marginal Effects of Multinomial Logit)

	dy/dx	Standard Error
PBRF Outcomes		
Proportion of academics attaining PBRF rank A		
Being on Benefit	0.0001	0.0002
Paid Employment	-0.0001	0.0006
Further Study	0.0002	0.0003
Others/Unknown/Overseas	-0.0002	0.0005
Proportion of academics attaining PBRF rank B		
Being on Benefit	0.0003*	0.0001
Paid Employment	-0.0003	0.0003
Further Study	0.0001	0.0002
Others/Unknown/Overseas	-0.0001	0.0002
Proportion of academics attaining PBRF rank C(NE)		
Being on Benefit	0.0002	0.0002
Paid Employment	0.0004	0.0006
Further Study	0.0002	0.0003
Others/Unknown/Overseas	-0.0008	0.0004
Proportion of academics attaining PBRF rank R		
Being on Benefit	0.0004*	0.0002
Paid Employment	-0.0003	0.0007
Further Study	0.0008**	0.0003
Others/Unknown/Overseas	-0.0009	0.0006
Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave		
Being on Benefit	-0.0001	0.0002
Paid Employment	-0.0010	0.0006
Further Study	0.0008***	0.0002
Others/Unknown/Overseas	0.0003	0.0005
Department Level Characteristics		
Researcher's Position Title		
Proportion of Professors		
Being on Benefit	-0.0001	0.0002
Paid Employment	0.0009	0.0006
Further Study	-0.0003	0.0003
Others/Unknown/Overseas	-0.0005	0.0004
Proportion of Associate Professors		
Being on Benefit	0.0003	0.0002
Paid Employment	-0.0001	0.0006
Further Study	-0.0003	0.0003
Others/Unknown/Overseas	0.0001	0.0004

Proportion of Lecturers		
Being on Benefit	0.0002	0.0002
Paid Employment	0.0004	0.0004
Further Study	-0.0002	0.0002
Others/Unknown/Overseas	-0.0003	0.0004
Proportion of Other Teaching Staff		
Being on Benefit	0.0001	0.0003
Paid Employment	0.0006	0.0008
Further Study	-0.0002	0.0003
Others/Unknown/Overseas	-0.0005	0.0006
Proportion of Other Non-Teaching Staff		
Being on Benefit	0.0001	0.0002
Paid Employment	-0.0009	0.0005
Further Study	0.0000	0.0003
Others/Unknown/Overseas	0.0008	0.0004
Researcher's Gender		
Proportion of female academics		
Being on Benefit	0.0001	0.0001
Paid Employment	-0.0002	0.0004
Further Study	-0.0002	0.0002
Others/Unknown/Overseas	0.0003	0.0003
Proportion of academics for whom gender is unknown		
Being on Benefit	-0.0001	0.0003
Paid Employment	0.0001	0.0007
Further Study	-0.0001	0.0003
Others/Unknown/Overseas	0.0001	0.0006
Researcher's Age Band		
Proportion of academics in the age band of 20 to 29		
Being on Benefit	0.0001	0.0005
Paid Employment	-0.0032*	0.0013
Further Study	0.0004	0.0007
Others/Unknown/Overseas	0.0027*	0.0012
Proportion of academics in the age band of 40 to 49		
Being on Benefit	0.0001	0.0002
Paid Employment	0.0004	0.0004
Further Study	-0.0004	0.0002
Others/Unknown/Overseas	0.0000	0.0003
Proportion of academics in the age band of 50 to 59		
Being on Benefit		0.0002
Paid Employment	0.0006	0.0005
Further Study	-0.0006*	0.0002
Others/Unknown/Overseas	0.0001	0.0003
Proportion of academics in the age band of 60 to 69		
Being on Benefit	-0.0001	0.0003
Paid Employment	0.0006	0.0006
Further Study	-0.0002	0.0003

Others/Unknown/Overseas	-0.0004	0.0005
Proportion of academics in the age band of 70 and Over		
Being on Benefit	0.0002	0.0006
Paid Employment	-0.0017	0.0014
Further Study	0.0000	0.0006
Others/Unknown/Overseas	0.0016	0.0010
Proportion of academics for whom age band is unknown		
Being on Benefit	0.0001	0.0003
Paid Employment	0.0002	0.0006
Further Study	-0.0003	0.0003
Others/Unknown/Overseas	-0.0001	0.0005
Researcher's Ethnicity		
Proportion of Asian academics		
Being on Benefit	0.0001	0.0003
Paid Employment	-0.0003	0.0006
Further Study	0.0009*	0.0004
Others/Unknown/Overseas	-0.0007	0.0004
Proportion of Māori academics		
Being on Benefit	0.0003	0.0002
Paid Employment	-0.0011	0.0006
Further Study	0.0002	0.0004
Others/Unknown/Overseas	0.0007	0.0005
Proportion of Pasifika academics		
Being on Benefit	0.0002	0.0005
Paid Employment	0.0015	0.0014
Further Study	-0.0019*	0.0008
Others/Unknown/Overseas	0.0002	0.0010
Proportion of Middle Eastern/Latin American/African academics		
Being on Benefit	0.0007	0.0010
Paid Employment	-0.0041**	0.0016
Further Study	0.002	0.0011
Others/Unknown/Overseas	0.0014	0.0014
Proportion of academics belonging to "other ethnicity"		
Being on Benefit	0.0003	0.0002
Paid Employment	-0.0006	0.0005
Further Study	0.0004	0.0002
Others/Unknown/Overseas	0.0000	0.0004
Proportion of academics for whom ethnicity is unknown		
Being on Benefit	0.0000	0.0001
Paid Employment	0.0000	0.0003
Further Study	0.0002	0.0002
Others/Unknown/Overseas	-0.0002	0.0003

Student Level Characteristics

Student's gender

Female student

Being on Benefit	-0.0078**	0.0028
Paid Employment	0.0091	0.0072
Further Study	-0.0219***	0.0039
Others/Unknown/Overseas	0.0207***	0.0060
Student's high school decile		
School decile 1		
Being on Benefit	-0.0014	0.0135
Paid Employment	0.0132	0.0314
Further Study	0.0121	0.0217
Others/Unknown/Overseas	-0.0240	0.0278
School decile 2		
Being on Benefit	0.0106	0.0086
Paid Employment	-0.0236	0.0240
Further Study	0.0006	0.0130
Others/Unknown/Overseas	0.0125	0.0207
School decile 3		
Being on Benefit	-0.0003	0.0064
Paid Employment	-0.0078	0.0156
Further Study	0.0131	0.0092
Others/Unknown/Overseas	-0.0049	0.0144
School decile 4		
Being on Benefit	0.0028	0.0073
Paid Employment	0.0034	0.0155
Further Study	-0.0025	0.0089
Others/Unknown/Overseas	-0.0036	0.0129
School decile 6		
Being on Benefit	0.0037	0.0062
Paid Employment	0.0236	0.0126
Further Study	-0.0065	0.0074
Others/Unknown/Overseas	-0.0208	0.0121
School decile 7		
Being on Benefit	-0.0049	0.0062
Paid Employment	-0.0068	0.0126
Further Study	0.0066	0.0073
Others/Unknown/Overseas	0.0051	0.0106
School decile 8		
Being on Benefit	-0.0085	0.0065
Paid Employment	0.0061	0.0132
Further Study	-0.0048	0.0075
Others/Unknown/Overseas	0.0071	0.0113
School decile 9		
Being on Benefit	-0.0145*	0.0067
Paid Employment	0.0051	0.0127
Further Study	0.0022	0.0074
Others/Unknown/Overseas	0.0072	0.0104
School decile 10		

Being on Benefit	-0.0299***	0.0064
Paid Employment	0.0066	0.0121
Further Study	-0.0023	0.0069
Others/Unknown/Overseas	0.0256*	0.0113
School decile missing		
Being on Benefit	0.0149	0.0157
Paid Employment	-0.0319	0.0354
Further Study	0.0284	0.0167
Others/Unknown/Overseas	-0.0114	0.0311
Level of NCEA achieved by the student		
Achieved less than NCEA level 3		
Being on Benefit	0.0241***	0.0033
Paid Employment	-0.056***	0.0074
Further Study	0.0219***	0.0041
Others/Unknown/Overseas	0.0100	0.0061
Overseas equivalent to NCEA level 3		
Being on Benefit	-0.0313*	0.0129
Paid Employment	0.0150	0.0181
Further Study	-0.0028	0.0100
Others/Unknown/Overseas	0.0191	0.0146
Missing observations on NCEA level achieved		
Being on Benefit	0.0106	0.0128
Paid Employment	-0.0390	0.0315
Further Study	0.0062	0.0159
Others/Unknown/Overseas	0.0222	0.0281
University fixed effects		
University 1		
University 2		
Being on Benefit	-0.0352*	0.0142
Paid Employment	0.0934***	0.0289
Further Study	-0.0395***	0.0114
Others/Unknown/Overseas	-0.0187	0.0181
University 3		
Being on Benefit	-0.0183	0.0111
Paid Employment	0.0366	0.0253
Further Study	-0.0173	0.0099
Others/Unknown/Overseas	-0.0010	0.0157
University 4		
Being on Benefit	-0.0214*	0.0108
Paid Employment	0.0272	0.0294
Further Study	-0.0025	0.0104
Others/Unknown/Overseas	-0.0033	0.0197
University 5		
Being on Benefit	-0.0221*	0.0106
Paid Employment	0.0160	0.0260

Further Study	-0.0061	0.0103
Others/Unknown/Overseas	0.0121	0.0164
University 6		
Being on Benefit	0.0020	0.0118
Paid Employment	-0.0320	0.0275
Further Study	-0.0006	0.0102
Others/Unknown/Overseas	0.0306	0.0173
University 7		
Being on Benefit	0.0018	0.0113
Paid Employment	-0.0131	0.0269
Further Study	-0.0023	0.0100
Others/Unknown/Overseas	0.0136	0.0167
University 8		
Being on Benefit	-0.0152	0.0120
Paid Employment	-0.0094	0.0299
Further Study	-0.0147	0.0123
Others/Unknown/Overseas	0.0393	0.0232
Subject Area fixed effects		
Accounting and Finance		
Agriculture and Other Applied Biological Sciences		
Being on Benefit	0.0181	0.0163
Paid Employment	-0.0476	0.0288
Further Study	0.0591***	0.0176
Others/Unknown/Overseas	-0.0297	0.0188
Anthropology and Archaeology		
Being on Benefit	0.0640**	0.0231
Paid Employment	-0.1580***	0.0417
Further Study	0.0797**	0.0258
Others/Unknown/Overseas	0.0144	0.0335
Architecture, Design, Planning, Surveying		
Being on Benefit	0.0219*	0.0103
Paid Employment	-0.0908***	0.0273
Further Study	0.0293**	0.0108
Others/Unknown/Overseas	0.0397	0.0214
Biomedical		
Being on Benefit	-0.0070	0.0124
Paid Employment	-0.0310	0.0859
Further Study	0.0667*	0.0307
Others/Unknown/Overseas	-0.0288	0.0673
Chemistry		
Being on Benefit	0.0127	0.0144
Paid Employment	-0.1846***	0.0389
Further Study	0.1705***	0.0453
Others/Unknown/Overseas	0.0015	0.0345
Clinical Medicine		

Being on Benefit	-0.0220**	0.0075
Paid Employment	0.0883	0.0502
Further Study	0.0696	0.0356
Others/Unknown/Overseas	-0.1359***	0.0179
Communications, Journalism and Media Studies		
Being on Benefit	0.0162	0.0133
Paid Employment	-0.0909***	0.0275
Further Study	-0.0036	0.0093
Others/Unknown/Overseas	0.0783***	0.0222
Computer Science, Information Technology, Information Sciences		
Being on Benefit	0.0198	0.0113
Paid Employment	-0.0131	0.0280
Further Study	0.02600**	0.0100
Others/Unknown/Overseas	-0.0326	0.0222
Dentistry		
Being on Benefit	0.0283	0.0227
Paid Employment	0.0136	0.0288
Further Study	0.0150	0.0101
Others/Unknown/Overseas	-0.0569**	0.0211
Design		
Being on Benefit	0.0216	0.0131
Paid Employment	-0.1485***	0.0368
Further Study	0.0062	0.0120
Others/Unknown/Overseas	0.1207***	0.0298
Earth Sciences		
Being on Benefit	0.0292*	0.0131
Paid Employment	-0.1582***	0.0253
Further Study	0.0469***	0.0145
Others/Unknown/Overseas	0.0821***	0.0200
Ecology, Evolution and Behaviour		
Being on Benefit	0.0408**	0.0134
Paid Employment	-0.1144***	0.0273
Further Study	0.0663***	0.0171
Others/Unknown/Overseas	0.0073	0.0209
Economics		
Being on Benefit	0.0059	0.0090
Paid Employment	-0.0809**	0.0278
Further Study	-0.0013	0.0075
Others/Unknown/Overseas	0.0764**	0.0265
Education		
Being on Benefit	0.0315**	0.0113
Paid Employment	-0.0220	0.0265
Further Study	0.0263*	0.0109
Others/Unknown/Overseas	-0.0359*	0.0172
Engineering and Technology		
Being on Benefit	-0.0103	0.0108

Paid Employment	-0.0520	0.0350
Further Study	-0.0037	0.0103
Others/Unknown/Overseas	0.0660	0.0361
English Language and Literature		
Being on Benefit	0.0666***	0.0145
Paid Employment	-0.1537***	0.0259
Further Study	0.0751***	0.0174
Others/Unknown/Overseas	0.0120	0.0215
Foreign Languages and Linguistics		
Being on Benefit	0.0316*	0.0138
Paid Employment	-0.2092***	0.0241
Further Study	0.0741***	0.0102
Others/Unknown/Overseas	0.1034***	0.0200
History, History of Art, Classics and Curatorial Studies		
Being on Benefit	0.0519***	0.0108
Paid Employment	-0.1464***	0.0245
Further Study	0.0815***	0.0141
Others/Unknown/Overseas	0.0130	0.0177
Human Geography		
Being on Benefit	0.0240	0.0253
Paid Employment	-0.1230**	0.0455
Further Study	0.0355	0.0207
Others/Unknown/Overseas	0.0635	0.0350
Law		
Being on Benefit	0.0132	0.0078
Paid Employment	-0.0046	0.0236
Further Study	0.0379***	0.0111
Others/Unknown/Overseas	-0.0465**	0.0173
Management, Human Resources, Industrial Relations, International Business and Other Business		
Being on Benefit	0.0085	0.0098
Paid Employment	-0.0804***	0.0237
Further Study	0.0100	0.0084
Others/Unknown/Overseas	0.0619***	0.0174
Marketing and Tourism		
Being on Benefit	0.0056	0.0078
Paid Employment	-0.1038***	0.0265
Further Study	-0.0084	0.0069
Others/Unknown/Overseas	0.1066***	0.0214
Molecular, Cellular and Whole Organism Biology		
Being on Benefit	0.0254*	0.0127
Paid Employment	-0.1439***	0.0325
Further Study	0.0801***	0.0172
Others/Unknown/Overseas	0.0384	0.0281
Music, Literary Arts and Other Arts		
Being on Benefit	0.0856***	0.0185

Paid Employment	-0.1942***	0.0321
Further Study	0.0521**	0.0194
Others/Unknown/Overseas	0.0565*	0.0228
Māori Knowledge and Development		
Being on Benefit	0.0887	0.0457
Paid Employment	-0.1260	0.0829
Further Study	0.0882	0.0594
Others/Unknown/Overseas	-0.0509	0.0421
Other Health Studies (including Rehabilitation Therapies)		
Being on Benefit	0.0144	0.0101
Paid Employment	-0.0340	0.0288
Further Study	0.0380***	0.0090
Others/Unknown/Overseas	-0.0184	0.0214
Philosophy		
Being on Benefit	0.0835***	0.0187
Paid Employment	-0.2217***	0.0405
Further Study	0.1279***	0.0272
Others/Unknown/Overseas	0.0102	0.0235
Physics		
Being on Benefit	0.0292	0.0201
Paid Employment	-0.1923***	0.0564
Further Study	0.1466***	0.0427
Others/Unknown/Overseas	0.0165	0.0240
Political Science, International Relations and Public Policy		
Being on Benefit	0.0127	0.0094
Paid Employment	-0.1035***	0.0239
Further Study	0.0508***	0.0111
Others/Unknown/Overseas	0.0400*	0.0171
Psychology		
Being on Benefit	0.0469***	0.0098
Paid Employment	-0.1367***	0.0293
Further Study	0.0856***	0.0146
Others/Unknown/Overseas	0.0042	0.0208
Public Health		
Being on Benefit	0.1238**	0.0466
Paid Employment	-0.2081**	0.0804
Further Study	0.1309*	0.0668
Others/Unknown/Overseas	-0.0466	0.0278
Pure and Applied Mathematics		
Being on Benefit	0.0458**	0.0162
Paid Employment	-0.1677***	0.0408
Further Study	0.0634**	0.0203
Others/Unknown/Overseas	0.0585	0.0399
Religious Studies and Theology		
Being on Benefit	0.0401	0.0222
Paid Employment	-0.1544***	0.0471

Further Study	0.0760*	0.0308
Others/Unknown/Overseas	0.0382	0.0270
Sociology, Social Policy, Social Work, Criminology and Gender Studies		
Being on Benefit	0.0531***	0.0127
Paid Employment	-0.1161***	0.0255
Further Study	0.0493***	0.0112
Others/Unknown/Overseas	0.0138	0.0185
Sport and Exercise Science		
Being on Benefit	-0.0024	0.0087
Paid Employment	0.0059	0.0274
Further Study	-0.0052	0.0084
Others/Unknown/Overseas	0.0017	0.0241
Statistics		
Being on Benefit	0.0516	0.0269
Paid Employment	-0.0977**	0.0315
Further Study	0.0739***	0.0130
Others/Unknown/Overseas	-0.0278	0.0267
Theatre and Dance, Film and Television and Multimedia		
Being on Benefit	0.1276***	0.0297
Paid Employment	-0.2048***	0.0628
Further Study	0.0282	0.0300
Others/Unknown/Overseas	0.0490	0.0321
Veterinary Studies and Large Animal Science		
Being on Benefit	0.0379**	0.0122
Paid Employment	-0.0043	0.0259
Further Study	0.0358**	0.0124
Others/Unknown/Overseas	-0.0695***	0.0209
Visual Arts and Crafts		
Being on Benefit	0.0895***	0.0196
Paid Employment	-0.2338***	0.0474
Further Study	0.0467***	0.0134
Others/Unknown/Overseas	0.0975*	0.0467
Year fixed effects		
First year at the tertiary education institute of the student – 1999		
Being on Benefit	-0.0305***	0.0047
Paid Employment	0.0364*	0.0183
Further Study	-0.0230***	0.0061
Others/Unknown/Overseas	0.0171	0.0179
First year at the tertiary education institute of the student – 2007		
Being on Benefit	-0.0692***	0.0078
Paid Employment	-0.0004	0.0260
Further Study	-0.0223*	0.0114
Others/Unknown/Overseas	0.0919***	0.0227
First year at the tertiary education institute of the student – 2008		
Being on Benefit	-0.0726***	0.0079

Paid Employment	0.0137	0.0258
Further Study	-0.0343**	0.0113
Others/Unknown/Overseas	0.0932***	0.0227
Number of observations	26,856	

Notes: (1) The dependent variable is the *labour market status* of the student. (2) Robust standard errors are clustered on the *id* (*id* is composed of evaluation year, university, and subject area) level. Standard error adjusted for 521 clusters in id. (3) The base outcome variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (4) The base outcome variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. (5) I have estimated all the above coefficients by using university, subject area, and year fixed effects. (6) I am not allowed to identify specific universities due to 5.14.2 entity clause of Stats NZ. (7) * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$.

Table 4.D.2: Determinants of Labour Market Outcomes; Subsample Analysis Student's Ethnicity NZ Māori (Marginal Effects of Multinomial Logit)

	dy/dx	Standard Error
PBRF Outcomes		
Proportion of academics attaining PBRF rank A		
Being on Benefit	0.0031*	0.0016
Paid Employment	0.0008	0.0023
Further Study	-0.0002	0.0010
Others/Unknown/Overseas	-0.0037**	0.0013
Proportion of academics attaining PBRF rank B		
Being on Benefit	0.0010	0.0010
Paid Employment	-0.0001	0.0013
Further Study	-0.0006	0.0006
Others/Unknown/Overseas	-0.0004	0.0009
Proportion of academics attaining PBRF rank C(NE)		
Being on Benefit	-0.0026	0.0019
Paid Employment	0.0030	0.0026
Further Study	-0.0010	0.0012
Others/Unknown/Overseas	0.0007	0.0016
Proportion of academics attaining PBRF rank R		
Being on Benefit	-0.0009	0.0012
Paid Employment	0.0013	0.0020
Further Study	0.0006	0.0005
Others/Unknown/Overseas	-0.0010	0.0015
Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave		
Being on Benefit	-0.0005	0.0010
Paid Employment	-0.0001	0.0019
Further Study	-0.0007	0.0008
Others/Unknown/Overseas	0.0014	0.0014
Department Level Characteristics		
Researcher's Position Title		
Proportion of Professors		
Being on Benefit	-0.0017	0.0018
Paid Employment	-0.0017	0.0024
Further Study	-0.0009	0.0009
Others/Unknown/Overseas	0.0042*	0.0017
Proportion of Associate Professors		
Being on Benefit	0.0005	0.0015
Paid Employment	-0.0009	0.0022
Further Study	-0.0018*	0.0008
Others/Unknown/Overseas	0.0022	0.0015
Proportion of Lecturers		
Being on Benefit	-0.0009	0.0012
Paid Employment	0.0018	0.0015

Further Study	-0.0010	0.0006
Others/Unknown/Overseas	0.0002	0.0011
Proportion of Other Teaching Staff		
Being on Benefit	-0.0005	0.0019
Paid Employment	0.0013	0.0030
Further Study	0.0002	0.0012
Others/Unknown/Overseas	-0.0009	0.0021
Proportion of Other Non-Teaching Staff		
Being on Benefit	-0.0002	0.0012
Paid Employment	-0.0021	0.0017
Further Study	-0.0011	0.0007
Others/Unknown/Overseas	0.0034***	0.0010
Researcher's Gender		
Proportion of female academics		
Being on Benefit	0.0011	0.0008
Paid Employment	-0.0014	0.0013
Further Study	0.0002	0.0005
Others/Unknown/Overseas	0.0000	0.0011
Proportion of academics for whom gender is unknown		
Being on Benefit	-0.0012	0.0011
Paid Employment	-0.0015	0.0025
Further Study	0.0019	0.0013
Others/Unknown/Overseas	0.0008	0.0016
Researcher's Age Band		
Proportion of academics in the age band of 20 to 29		
Being on Benefit	-0.0028	0.0033
Paid Employment	0.0080	0.0042
Further Study	0.0005	0.0019
Others/Unknown/Overseas	-0.0057	0.0031
Proportion of academics in the age band of 40 to 49		
Being on Benefit	-0.0017*	0.0008
Paid Employment	-0.0014	0.0013
Further Study	0.0006	0.0007
Others/Unknown/Overseas	0.0024*	0.0010
Proportion of academics in the age band of 50 to 59		
Being on Benefit	-0.0026*	0.0011
Paid Employment	0.0023	0.0017
Further Study	0.0001	0.0008
Others/Unknown/Overseas	0.0002	0.0014
Proportion of academics in the age band of 60 to 69		
Being on Benefit	-0.0010	0.0013
Paid Employment	-0.0009	0.0020
Further Study	0.0005	0.0009
Others/Unknown/Overseas	0.0014	0.0012
Proportion of academics in the age band of 70 and Over		
Being on Benefit	0.0053	0.0031

Paid Employment	-0.0069	0.0043
Further Study	0.0061**	0.0020
Others/Unknown/Overseas	-0.0045	0.0024
Proportion of academics for whom age band is unknown		
Being on Benefit	-0.0013	0.0015
Paid Employment	0.0027	0.0023
Further Study	-0.0008	0.0012
Others/Unknown/Overseas	-0.0007	0.0013
Researcher's Ethnicity		
Proportion of Asian academics		
Being on Benefit	-0.0003	0.0020
Paid Employment	0.0008	0.0027
Further Study	-0.0005	0.0012
Others/Unknown/Overseas	0.0001	0.0017
Proportion of Māori academics		
Being on Benefit	-0.0001	0.0007
Paid Employment	0.0006	0.0011
Further Study	-0.0004	0.0004
Others/Unknown/Overseas	0.0000	0.0008
Proportion of Pasifika academics		
Being on Benefit	-0.0115**	0.0044
Paid Employment	0.0092	0.0052
Further Study	0.0004	0.0024
Others/Unknown/Overseas	0.0020	0.0029
Proportion of Middle Eastern/Latin American/African academics		
Being on Benefit	-0.0014	0.0069
Paid Employment	-0.0123	0.0095
Further Study	0.0063	0.0037
Others/Unknown/Overseas	0.0073	0.0041
Proportion of academics belonging to "other ethnicity"		
Being on Benefit	0.0016	0.0012
Paid Employment	-0.0035*	0.0017
Further Study	0.0002	0.0007
Others/Unknown/Overseas	0.0016	0.0010
Proportion of academics for whom ethnicity is unknown		
Being on Benefit	0.0012	0.0008
Paid Employment	-0.0020	0.0013
Further Study	-0.0004	0.0004
Others/Unknown/Overseas	0.0012	0.0009

Student Level Characteristics
Student's gender

Female student		
Being on Benefit	0.0383	0.0201
Paid Employment	-0.0112	0.0246
Further Study	-0.0168	0.0100
Others/Unknown/Overseas	-0.0103	0.0150
Student's high school decile		
School decile 1		
Being on Benefit	0.0314	0.0344
Paid Employment	0.0472	0.0513
Further Study	-0.0246	0.0181
Others/Unknown/Overseas	-0.0539	0.0398
School decile 2		
Being on Benefit	0.0098	0.0390
Paid Employment	0.0295	0.0572
Further Study	-0.0474*	0.0225
Others/Unknown/Overseas	0.0082	0.0309
School decile 3		
Being on Benefit	-0.0151	0.0299
Paid Employment	0.0760	0.0486
Further Study	-0.0291	0.0158
Others/Unknown/Overseas	-0.0317	0.0317
School decile 4		
Being on Benefit	-0.0307	0.0346
Paid Employment	0.0676	0.0506
Further Study	-0.0245	0.0172
Others/Unknown/Overseas	-0.0125	0.0344
School decile 6		
Being on Benefit	-0.0415	0.0380
Paid Employment	0.1419**	0.0543
Further Study	-0.0354	0.0211
Others/Unknown/Overseas	-0.0649	0.0368
School decile 7		
Being on Benefit	-0.1046*	0.0451
Paid Employment	0.1479*	0.0626
Further Study	-0.0492*	0.0219
Others/Unknown/Overseas	0.0059	0.0369
School decile 8		
Being on Benefit	-0.1068*	0.0476
Paid Employment	0.1562*	0.0621
Further Study	-0.0289	0.0214
Others/Unknown/Overseas	-0.0205	0.0373
School decile 9		
Being on Benefit	-0.0141	0.0376
Paid Employment	0.0575	0.0585
Further Study	-0.0460	0.0306
Others/Unknown/Overseas	0.0026	0.0398

School decile 10		
Being on Benefit	-0.1063*	0.0543
Paid Employment	0.1583*	0.0661
Further Study	-0.0525*	0.0248
Others/Unknown/Overseas	0.0005	0.0378
School decile missing		
Being on Benefit	0.1438	0.1403
Paid Employment	-0.0081	0.2568
Further Study	0.0319	0.0861
Others/Unknown/Overseas	-0.1676	0.1220
Level of NCEA achieved by the student		
Achieved less than NCEA level 3		
Being on Benefit	0.0271	0.0222
Paid Employment	-0.0641*	0.0304
Further Study	0.0191	0.0133
Others/Unknown/Overseas	0.018	0.0164
Overseas equivalent to NCEA level 3		
Being on Benefit	-1.4697***	0.1315
Paid Employment	1.1506***	0.1475
Further Study	0.1235*	0.0502
Others/Unknown/Overseas	0.1956	0.1046
Missing observations on NCEA level achieved		
Being on Benefit	0.0753*	0.0368
Paid Employment	-0.1901**	0.0612
Further Study	0.0244	0.0201
Others/Unknown/Overseas	0.0905*	0.0389
University fixed effects		
University 1		
University 2		
Being on Benefit	-0.0646	0.0823
Paid Employment	-0.0482	0.1066
Further Study	0.0721	0.0753
Others/Unknown/Overseas	0.0407	0.0640
University 3		
Being on Benefit	-0.0296	0.0762
Paid Employment	-0.0081	0.0811
Further Study	0.0138	0.0237
Others/Unknown/Overseas	0.0238	0.0517
University 4		
Being on Benefit	-0.0449	0.0646
Paid Employment	0.0366	0.0721
Further Study	-0.0027	0.0145
Others/Unknown/Overseas	0.0110	0.0438
University 5		
Being on Benefit	-0.0299	0.0753

Paid Employment	0.0453	0.0850
Further Study	-0.0064	0.0164
Others/Unknown/Overseas	-0.0090	0.0402
University 6		
Being on Benefit	-0.0352	0.0714
Paid Employment	-0.0241	0.0878
Further Study	0.0466	0.0299
Others/Unknown/Overseas	0.0127	0.0396
University 7		
Being on Benefit	-0.0102	0.0594
Paid Employment	-0.0233	0.0612
Further Study	0.0434*	0.0179
Others/Unknown/Overseas	-0.0099	0.0281
University 8		
Being on Benefit	-0.0888	0.0664
Paid Employment	-0.0104	0.0945
Further Study	0.0494	0.0378
Others/Unknown/Overseas	0.0498	0.0665
Subject area fixed effects		
Accounting and Finance		
Agriculture and Other Applied Biological Sciences		
Being on Benefit	0.0014	0.1454
Paid Employment	0.0642	0.1590
Further Study	0.0524	0.0913
Others/Unknown/Overseas	-0.1181	0.0606
Anthropology and Archaeology		
Being on Benefit	-0.0935	0.1370
Paid Employment	-0.0288	0.1945
Further Study	0.2017	0.1490
Others/Unknown/Overseas	-0.0793	0.0845
Architecture, Design, Planning, Surveying		
Being on Benefit	-0.1053	0.1143
Paid Employment	-0.2075	0.1271
Further Study	0.1985*	0.0854
Others/Unknown/Overseas	0.1143	0.0878
Chemistry		
Being on Benefit	-0.0038	0.2330
Paid Employment	-0.1676	0.2550
Further Study	0.2320	0.2936
Others/Unknown/Overseas	-0.0605	0.1425
Clinical Medicine		
Being on Benefit	-0.1327	0.1220
Paid Employment	0.2467*	0.1224
Further Study	0.0260	0.0437
Others/Unknown/Overseas	-0.1400*	0.0578

Communications, Journalism and Media Studies		
Being on Benefit	-0.0957	0.1149
Paid Employment	-0.0317	0.1424
Further Study	0.0191	0.0373
Others/Unknown/Overseas	0.1083	0.1135
Computer Science, Information Technology, Information Sciences		
Being on Benefit	-0.0850	0.1263
Paid Employment	0.0068	0.1671
Further Study	0.1768	0.1204
Others/Unknown/Overseas	-0.0986	0.0579
Dentistry		
Being on Benefit	0.1364	0.1321
Paid Employment	0.0499	0.1438
Further Study	-0.0327	0.0248
Others/Unknown/Overseas	-0.1536**	0.0566
Design		
Being on Benefit	-0.1145	0.1329
Paid Employment	-0.2289	0.1660
Further Study	0.0717	0.0702
Others/Unknown/Overseas	0.2717	0.1549
Earth Sciences		
Being on Benefit	-0.0871	0.1170
Paid Employment	-0.0712	0.1613
Further Study	0.0291	0.0626
Others/Unknown/Overseas	0.1292	0.1267
Ecology, Evolution and Behaviour		
Being on Benefit	0.0153	0.1584
Paid Employment	-0.3259	0.2421
Further Study	0.4641	0.2477
Others/Unknown/Overseas	-0.1536**	0.0566
Economics		
Being on Benefit	-0.1657	0.1009
Paid Employment	0.1019	0.1410
Further Study	0.0327	0.0784
Others/Unknown/Overseas	0.0310	0.0937
Education		
Being on Benefit	-0.0728	0.1164
Paid Employment	0.0981	0.1298
Further Study	0.0455	0.0358
Others/Unknown/Overseas	-0.0707	0.0693
Engineering and Technology		
Being on Benefit	-0.0712	0.1100
Paid Employment	-0.0338	0.1368
Further Study	0.1907	0.1146
Others/Unknown/Overseas	-0.0857	0.0522
English Language and Literature		

Being on Benefit	-0.0905	0.1149
Paid Employment	0.0836	0.1609
Further Study	0.0411	0.0737
Others/Unknown/Overseas	-0.0342	0.1260
Foreign Languages and Linguistics		
Being on Benefit	-0.0582	0.1183
Paid Employment	0.0382	0.1268
Further Study	0.0879	0.0684
Others/Unknown/Overseas	-0.0679	0.0695
History, History of Art, Classics and Curatorial Studies		
Being on Benefit	-0.0245	0.1241
Paid Employment	0.0411	0.1529
Further Study	0.0297	0.0656
Others/Unknown/Overseas	-0.0462	0.0743
Human Geography		
Being on Benefit	-0.1867	0.1045
Paid Employment	-0.0267	0.1939
Further Study	0.1808	0.1234
Others/Unknown/Overseas	0.0326	0.1288
Law		
Being on Benefit	-0.1244	0.1060
Paid Employment	0.0272	0.1187
Further Study	0.1722***	0.0513
Others/Unknown/Overseas	-0.0749	0.0582
Management, Human Resources, Industrial Relations, International Business and Other Business		
Being on Benefit	-0.1385	0.1011
Paid Employment	0.1296	0.1185
Further Study	0.0714	0.0418
Others/Unknown/Overseas	-0.0625	0.0608
Marketing and Tourism		
Being on Benefit	-0.0738	0.0999
Paid Employment	0.0174	0.1055
Further Study	0.0307	0.0394
Others/Unknown/Overseas	0.0257	0.0776
Molecular, Cellular and Whole Organism Biology		
Being on Benefit	-0.0648	0.1129
Paid Employment	0.0362	0.1385
Further Study	0.1054	0.0756
Others/Unknown/Overseas	-0.0769	0.0696
Music, Literary Arts and Other Arts		
Being on Benefit	-0.0464	0.1449
Paid Employment	-0.0908	0.2090
Further Study	-0.0327	0.0248
Others/Unknown/Overseas	0.1699	0.1785
Māori Knowledge and Development		

Being on Benefit	0.0056	0.1823
Paid Employment	-0.2008	0.1792
Further Study	0.2034	0.1185
Others/Unknown/Overseas	-0.0082	0.1049
Other Health Studies (including Rehabilitation Therapies)		
Being on Benefit	-0.0754	0.1063
Paid Employment	0.0388	0.1236
Further Study	0.0955	0.0508
Others/Unknown/Overseas	-0.0589	0.0695
Philosophy		
Being on Benefit	-0.1324	0.1184
Paid Employment	0.0832	0.1557
Further Study	-0.0327	0.0248
Others/Unknown/Overseas	0.0819	0.1159
Physics		
Being on Benefit	-0.1401	0.1179
Paid Employment	0.3264**	0.1229
Further Study	-0.0327	0.0248
Others/Unknown/Overseas	-0.1536**	0.0566
Political Science, International Relations and Public Policy		
Being on Benefit	-0.1680	0.1042
Paid Employment	0.1326	0.1352
Further Study	-0.0327	0.0248
Others/Unknown/Overseas	0.0681	0.0936
Psychology		
Being on Benefit	-0.1269	0.1143
Paid Employment	-0.1515	0.1601
Further Study	0.2115***	0.0651
Others/Unknown/Overseas	0.0670	0.0947
Public Health		
Being on Benefit	-0.1522	0.1057
Paid Employment	0.1241	0.2215
Further Study	0.1185	0.1970
Others/Unknown/Overseas	-0.0904	0.0727
Pure and Applied Mathematics		
Being on Benefit	-0.1125	0.1352
Paid Employment	-0.1207	0.2537
Further Study	0.3364	0.2646
Others/Unknown/Overseas	-0.1031	0.0773
Religious Studies and Theology		
Being on Benefit	-0.1867	0.1045
Paid Employment	0.0996	0.2629
Further Study	0.2407	0.2423
Others/Unknown/Overseas	-0.1536**	0.0566
Sociology, Social Policy, Social Work, Criminology and Gender Studies		

Being on Benefit	-0.0243	0.1202
Paid Employment	-0.1037	0.1327
Further Study	0.0253	0.0456
Others/Unknown/Overseas	0.1027	0.0891
Sport and Exercise Science		
Being on Benefit	-0.0638	0.1299
Paid Employment	0.1375	0.1285
Further Study	0.0303	0.0584
Others/Unknown/Overseas	-0.1040	0.0612
Statistics		
Being on Benefit	-0.1782	0.1036
Paid Employment	0.3385**	0.1139
Further Study	-0.0327	0.0248
Others/Unknown/Overseas	-0.1275*	0.0632
Theatre and Dance, Film and Television and Multimedia		
Being on Benefit	-0.0889	0.1595
Paid Employment	-0.3216	0.3098
Further Study	-0.0285	0.0262
Others/Unknown/Overseas	0.4390	0.3897
Veterinary Studies and Large Animal Science		
Being on Benefit	-0.1867	0.1045
Paid Employment	0.3730***	0.1107
Further Study	-0.0327	0.0248
Others/Unknown/Overseas	-0.1536**	0.0566
Visual Arts and Crafts		
Being on Benefit	-0.1513	0.1138
Paid Employment	-0.0547	0.1621
Further Study	0.2543	0.1343
Others/Unknown/Overseas	-0.0483	0.1143
Year fixed effects		
First year at the tertiary education institute of the student – 1999		
Being on Benefit	-0.0783***	0.0236
Paid Employment	0.1484***	0.0448
Further Study	-0.0338*	0.0173
Others/Unknown/Overseas	-0.0362	0.0390
First year at the tertiary education institute of the student – 2007		
Being on Benefit	-0.1709***	0.0533
Paid Employment	0.1680	0.0904
Further Study	-0.0481	0.0366
Others/Unknown/Overseas	0.0509	0.0612
First year at the tertiary education institute of the student – 2008		
Being on Benefit	-0.1797***	0.0524
Paid Employment	0.1748	0.0903
Further Study	-0.0390	0.0356
Others/Unknown/Overseas	0.0440	0.0618

Number of observations	1,635

Notes: (1) The dependent variable is the *labour market status* of the student. (2) Robust standard errors are clustered on the *id* (*id* is composed of evaluation year, university, and subject area) level. Standard error adjusted for 321 clusters in id. (3) The base outcome variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (4) The base outcome variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. (5) I have estimated all the above coefficients by using university, subject area, and year fixed effects. (6) I am not allowed to identify specific universities due to 5.14.2 entity clause of Stats NZ. (7) * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$.

Table 4.D.3: Determinants of Labour Market Outcomes; Subsample Analysis Student's Ethnicity – NZ Pasifika (Marginal Effects of Multinomial Logit)

	dy/dx	Standard Error
PBRF Outcomes		
Proportion of academics attaining PBRF rank A		
Being on Benefit	-0.0035	.
Paid Employment	-0.0051	.
Further Study	0.0028	.
Others/Unknown/Overseas	0.0058	.
Proportion of academics attaining PBRF rank B		
Being on Benefit	-0.0002	.
Paid Employment	-0.0034	.
Further Study	0.0014	.
Others/Unknown/Overseas	0.0022	.
Proportion of academics attaining PBRF rank C(NE)		
Being on Benefit	0.0017	.
Paid Employment	-0.0034	.
Further Study	-0.0020	.
Others/Unknown/Overseas	0.0037	.
Proportion of academics attaining PBRF rank R		
Being on Benefit	0.0012	.
Paid Employment	-0.0067	.
Further Study	0.0021	.
Others/Unknown/Overseas	0.0035	.
Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave		
Being on Benefit	0.0020	.
Paid Employment	-0.0051	.
Further Study	-0.0015	.
Others/Unknown/Overseas	0.0047	.
Department Level Characteristics		
Researcher's Position Title		
Proportion of Professors		
Being on Benefit	0.0014	.
Paid Employment	0.0017	.
Further Study	-0.0022	.
Others/Unknown/Overseas	-0.0009	.
Proportion of Associate Professors		
Being on Benefit	0.0034	.
Paid Employment	-0.0010	.
Further Study	0.0006	.
Others/Unknown/Overseas	-0.0030	.
Proportion of Lecturers		
Being on Benefit	0.0002	.
Paid Employment	0.0033	.

Further Study	0.0010	.
Others/Unknown/Overseas	-0.0045	.
Proportion of Other Teaching Staff		
Being on Benefit	-0.0027	.
Paid Employment	0.0014	.
Further Study	0.0001	.
Others/Unknown/Overseas	0.0012	.
Proportion of Other Non-Teaching Staff		
Being on Benefit	0.0017	.
Paid Employment	0.0005	.
Further Study	0.0010	.
Others/Unknown/Overseas	-0.0032	.
Researcher's Gender		
Proportion of female academics		
Being on Benefit	0.0016	.
Paid Employment	-0.0039	.
Further Study	0.0009	.
Others/Unknown/Overseas	0.0014	.
Proportion of academics for whom gender is unknown		
Being on Benefit	0.0026	.
Paid Employment	-0.0047	.
Further Study	0.0043	.
Others/Unknown/Overseas	-0.0023	.
Researcher's Age Band		
Proportion of academics in the age band of 20 to 29		
Being on Benefit	-0.0014	.
Paid Employment	0.0095	.
Further Study	-0.0118	.
Others/Unknown/Overseas	0.0037	.
Proportion of academics in the age band of 40 to 49		
Being on Benefit	0.0011	.
Paid Employment	0.0003	.
Further Study	-0.0017	.
Others/Unknown/Overseas	0.0003	.
Proportion of academics in the age band of 50 to 59		
Being on Benefit	0.0008	.
Paid Employment	0.0021	.
Further Study	-0.0003	.
Others/Unknown/Overseas	-0.0027	.
Proportion of academics in the age band of 60 to 69		
Being on Benefit	0.0006	.
Paid Employment	-0.0029	.
Further Study	0.0004	.
Others/Unknown/Overseas	0.0018	.

Proportion of academics in the age band of 70 and Over

Being on Benefit	-0.0046	.
Paid Employment	0.0085	.
Further Study	0.0075	.
Others/Unknown/Overseas	-0.0114	.
Proportion of academics for whom age band is unknown		
Being on Benefit	0.0003	.
Paid Employment	0.0040	.
Further Study	-0.0048	.
Others/Unknown/Overseas	0.0006	.

Researcher's Ethnicity

Proportion of Asian academics		
Being on Benefit	-0.0007	.
Paid Employment	0.0041	.
Further Study	-0.0025	.
Others/Unknown/Overseas	-0.0009	.
Proportion of Māori academics		
Being on Benefit	0.0021	.
Paid Employment	-0.0056	.
Further Study	-0.0008	.
Others/Unknown/Overseas	0.0043	.
Proportion of Pasifika academics		
Being on Benefit	0.0008	.
Paid Employment	0.0025	.
Further Study	-0.0018	.
Others/Unknown/Overseas	-0.0015	.
Proportion of Middle Eastern/Latin American/African academics		
Being on Benefit	-0.0016	.
Paid Employment	0.0000	.
Further Study	-0.0059	.
Others/Unknown/Overseas	0.0075	.
Proportion of academics belonging to "other ethnicity"		
Being on Benefit	0.0012	.
Paid Employment	0.0002	.
Further Study	-0.0002	.
Others/Unknown/Overseas	-0.0011	.
Proportion of academics for whom ethnicity is unknown		
Being on Benefit	-0.0004	.
Paid Employment	0.0005	.
Further Study	-0.0003	.
Others/Unknown/Overseas	0.0002	.

Student Level Characteristics

Student's gender		
Female student		
Being on Benefit	0.0001	.
Paid Employment	-0.0205	.
Further Study	0.0032	.
Others/Unknown/Overseas	0.0172	.
Student's high school decile		
School decile 1		
Being on Benefit	-0.0477	.
Paid Employment	0.0429	.
Further Study	0.0090	.
Others/Unknown/Overseas	-0.0042	.
School decile 2		
Being on Benefit	-0.0355	.
Paid Employment	-0.0012	.
Further Study	0.0225	.
Others/Unknown/Overseas	0.0142	.
School decile 3		
Being on Benefit	-0.0103	.
Paid Employment	-0.0020	.
Further Study	0.0308	.
Others/Unknown/Overseas	-0.0185	.
School decile 4		
Being on Benefit	-0.0414	.
Paid Employment	0.0845	.
Further Study	-0.0437	.
Others/Unknown/Overseas	0.0006	.
School decile 6		
Being on Benefit	-0.0481	.
Paid Employment	0.0744	.
Further Study	-0.0133	.
Others/Unknown/Overseas	-0.0130	.
School decile 7		
Being on Benefit	-0.0117	.
Paid Employment	-0.0288	.
Further Study	0.0147	.
Others/Unknown/Overseas	0.0258	.
School decile 8		
Being on Benefit	-0.0314	.
Paid Employment	0.0336	.
Further Study	0.0206	.
Others/Unknown/Overseas	-0.0228	.
School decile 9		
Being on Benefit	-0.0134	.
Paid Employment	0.0987	.
Further Study	0.0085	.

Others/Unknown/Overseas	-0.0938	.
School decile 10		
Being on Benefit	-0.1092	.
Paid Employment	0.0854	.
Further Study	-0.0023	.
Others/Unknown/Overseas	0.0261	.
School decile missing		
Being on Benefit	1.0478	.
Paid Employment	-3.1633	.
Further Study	-0.1789	.
Others/Unknown/Overseas	2.2944	.
Level of NCEA achieved by the student		
Achieved less than NCEA level 3		
Being on Benefit	0.0240	.
Paid Employment	-0.0946	.
Further Study	0.0005	.
Others/Unknown/Overseas	0.0701	.
Overseas equivalent to NCEA level 3		
Being on Benefit	0.0381	.
Paid Employment	-0.1823	.
Further Study	0.0229	.
Others/Unknown/Overseas	0.1213	.
Missing observations on NCEA level achieved		
Being on Benefit	-0.0746	.
Paid Employment	0.1005	.
Further Study	0.0992	.
Others/Unknown/Overseas	-0.1251	.
University fixed effects		
University 1	(base outcome)	
University 2		
Being on Benefit	-0.0445	.
Paid Employment	0.1145	.
Further Study	-0.0534	.
Others/Unknown/Overseas	-0.0165	.
University 3		
Being on Benefit	0.2841	.
Paid Employment	-0.2318	.
Further Study	-0.0672	.
Others/Unknown/Overseas	0.0149	.
University 4		
Being on Benefit	0.0121	.
Paid Employment	0.0001	.
Further Study	-0.0316	.
Others/Unknown/Overseas	0.0194	.

University 5		
Being on Benefit	0.0598	.
Paid Employment	-0.1133	.
Further Study	-0.0385	.
Others/Unknown/Overseas	0.0919	.
University 6		
Being on Benefit	0.2234	.
Paid Employment	-0.2158	.
Further Study	-0.0367	.
Others/Unknown/Overseas	0.0291	.
University 7		
Being on Benefit	0.0090	.
Paid Employment	-0.1202	.
Further Study	-0.0447	.
Others/Unknown/Overseas	0.1559	.
University 8		
Being on Benefit	0.0544	.
Paid Employment	-0.0307	.
Further Study	-0.0052	.
Others/Unknown/Overseas	-0.0186	.
Subject area fixed effects		
Accounting and Finance	(base outcome)	
Agriculture and Other Applied Biological Sciences		
Being on Benefit	0.0282	.
Paid Employment	-0.3780	.
Further Study	0.3548	.
Others/Unknown/Overseas	-0.0049	.
Anthropology and Archaeology		
Being on Benefit	-0.0059	.
Paid Employment	-0.0193	.
Further Study	-0.1035	.
Others/Unknown/Overseas	0.1286	.
Architecture, Design, Planning, Surveying		
Being on Benefit	-0.0477	.
Paid Employment	-0.0947	.
Further Study	0.2270	.
Others/Unknown/Overseas	-0.0847	.
Biomedical		
Being on Benefit	-0.0477	.
Paid Employment	0.4555	.
Further Study	-0.1680	.
Others/Unknown/Overseas	-0.2398	.
Chemistry		
Being on Benefit	0.2610	.

Paid Employment	0.0940	.
Further Study	-0.1560	.
Others/Unknown/Overseas	-0.1990	.
Clinical Medicine		
Being on Benefit	-0.0477	.
Paid Employment	-0.1811	.
Further Study	0.4686	.
Others/Unknown/Overseas	-0.2398	.
Communications, Journalism and Media Studies		
Being on Benefit	0.1057	.
Paid Employment	0.0658	.
Further Study	-0.1263	.
Others/Unknown/Overseas	-0.0451	.
Computer Science, Information Technology, Information Sciences		
Being on Benefit	0.0657	.
Paid Employment	-0.1000	.
Further Study	0.1383	.
Others/Unknown/Overseas	-0.1040	.
Dentistry		
Being on Benefit	-0.0477	.
Paid Employment	0.2955	.
Further Study	-0.1680	.
Others/Unknown/Overseas	-0.0797	.
Design		
Being on Benefit	0.0489	.
Paid Employment	0.2773	.
Further Study	-0.1419	.
Others/Unknown/Overseas	-0.1843	.
Earth Sciences		
Being on Benefit	-0.0477	.
Paid Employment	0.1290	.
Further Study	0.1041	.
Others/Unknown/Overseas	-0.1853	.
Ecology, Evolution and Behaviour		
Being on Benefit	-0.0477	.
Paid Employment	0.0577	.
Further Study	-0.1680	.
Others/Unknown/Overseas	0.1580	.
Economics		
Being on Benefit	0.0270	.
Paid Employment	-0.1023	.
Further Study	0.1083	.
Others/Unknown/Overseas	-0.0330	.
Education		
Being on Benefit	0.0633	.

Paid Employment	0.2109	.
Further Study	-0.1257	.
Others/Unknown/Overseas	-0.1485	.
Engineering and Technology		
Being on Benefit	-0.0280	.
Paid Employment	-0.4108	.
Further Study	0.3735	.
Others/Unknown/Overseas	0.0653	.
English Language and Literature		
Being on Benefit	0.0629	.
Paid Employment	0.1324	.
Further Study	-0.1272	.
Others/Unknown/Overseas	-0.0681	.
Foreign Languages and Linguistics		
Being on Benefit	0.2262	.
Paid Employment	0.0294	.
Further Study	-0.0811	.
Others/Unknown/Overseas	-0.1744	.
History, History of Art, Classics and Curatorial Studies		
Being on Benefit	0.0636	.
Paid Employment	0.1312	.
Further Study	-0.1003	.
Others/Unknown/Overseas	-0.0944	.
Human Geography		
Being on Benefit	0.6641	.
Paid Employment	-0.2943	.
Further Study	-0.1680	.
Others/Unknown/Overseas	-0.2018	.
Law		
Being on Benefit	0.0773	.
Paid Employment	0.0082	.
Further Study	0.0759	.
Others/Unknown/Overseas	-0.1613	.
Management, Human Resources, Industrial Relations, International Business and Other Business		
Being on Benefit	-0.0018	.
Paid Employment	0.0794	.
Further Study	-0.0733	.
Others/Unknown/Overseas	-0.0043	.
Marketing and Tourism		
Being on Benefit	0.0736	.
Paid Employment	0.1146	.
Further Study	-0.0217	.
Others/Unknown/Overseas	-0.1665	.
Molecular, Cellular and Whole Organism Biology		
Being on Benefit	0.0395	.

Paid Employment	-0.0417	.
Further Study	-0.0263	.
Others/Unknown/Overseas	0.0284	.
Music, Literary Arts and Other Arts		
Being on Benefit	0.1679	.
Paid Employment	-0.1352	.
Further Study	-0.0049	.
Others/Unknown/Overseas	-0.0278	.
Māori Knowledge and Development		
Being on Benefit	-0.0477	.
Paid Employment	0.4555	.
Further Study	-0.1680	.
Others/Unknown/Overseas	-0.2398	.
Other Health Studies (including Rehabilitation Therapies)		
Being on Benefit	-0.0064	.
Paid Employment	0.2468	.
Further Study	-0.1121	.
Others/Unknown/Overseas	-0.1283	.
Philosophy		
Being on Benefit	0.3825	.
Paid Employment	-0.2650	.
Further Study	-0.1454	.
Others/Unknown/Overseas	0.0279	.
Physics		
Being on Benefit	0.0171	.
Paid Employment	-0.0134	.
Further Study	-0.1680	.
Others/Unknown/Overseas	0.1644	.
Political Science, International Relations and Public Policy		
Being on Benefit	0.1916	.
Paid Employment	-0.0458	.
Further Study	-0.1393	.
Others/Unknown/Overseas	-0.0065	.
Psychology		
Being on Benefit	0.0485	.
Paid Employment	0.2441	.
Further Study	-0.1074	.
Others/Unknown/Overseas	-0.1852	.
Public Health		
Being on Benefit	0.0030	.
Paid Employment	0.1394	.
Further Study	0.0110	.
Others/Unknown/Overseas	-0.1533	.
Pure and Applied Mathematics		
Being on Benefit	0.1221	.

Paid Employment	-0.0657	.
Further Study	-0.0245	.
Others/Unknown/Overseas	-0.0318	.
Religious Studies and Theology		
Being on Benefit	0.1257	.
Paid Employment	0.2152	.
Further Study	-0.1010	.
Others/Unknown/Overseas	-0.2398	.
Sociology, Social Policy, Social Work, Criminology and Gender Studies		
Being on Benefit	0.0423	.
Paid Employment	-0.0003	.
Further Study	-0.1031	.
Others/Unknown/Overseas	0.0611	.
Sport and Exercise Science		
Being on Benefit	0.1180	.
Paid Employment	0.1513	.
Further Study	-0.1680	.
Others/Unknown/Overseas	-0.1012	.
Statistics		
Being on Benefit	0.3397	.
Paid Employment	-0.1221	.
Further Study	-0.1421	.
Others/Unknown/Overseas	-0.0755	.
Theatre and Dance, Film and Television and Multimedia		
Being on Benefit	0.6209	.
Paid Employment	-0.3097	.
Further Study	-0.1680	.
Others/Unknown/Overseas	-0.1433	.
Visual Arts and Crafts		
Being on Benefit	0.1637	.
Paid Employment	0.1475	.
Further Study	-0.1473	.
Others/Unknown/Overseas	-0.1639	.
Year fixed effects		
First year at the tertiary education institute of the student – 1999		
Being on Benefit	-0.0478	.
Paid Employment	0.0565	.
Further Study	0.0165	.
Others/Unknown/Overseas	-0.0253	.
First year at the tertiary education institute of the student – 2007		
Being on Benefit	-0.0497	.
Paid Employment	-0.0228	.
Further Study	-0.0062	.
Others/Unknown/Overseas	0.0786	.

First year at the tertiary education institute of the student – 2008		
Being on Benefit	-0.0817	.
Paid Employment	0.0196	.
Further Study	-0.0200	.
Others/Unknown/Overseas	0.0821	.
Number of observations	1,254	

Notes: (1) The dependent variable is the *labour market status* of the student. (2) Robust standard errors are clustered on the *id* (*id* is composed of evaluation year, university, and subject area) level. Standard error adjusted for 250 clusters in id. (3) The base outcome variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (4) The base outcome variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. (5) I have estimated all the above coefficients by using university, subject area, and year fixed effects. (6) I am not allowed to identify specific universities due to 5.14.2 entity clause of Stats NZ. (7) * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$.

Table 4.D.4: Determinants of Labour Market Outcomes; Subsample Analysis Student's Ethnicity – Asian (Marginal Effects of Multinomial Logit)

	dy/dx	Standard Error
PBRF Outcomes		
Proportion of academics attaining PBRF rank A		
Being on Benefit	-0.0005	0.0004
Paid Employment	0.0011	0.0016
Further Study	-0.0010	0.0008
Others/Unknown/Overseas	0.0003	0.0013
Proportion of academics attaining PBRF rank B		
Being on Benefit	0.0000	0.0003
Paid Employment	-0.0004	0.0011
Further Study	0.0006	0.0005
Others/Unknown/Overseas	-0.0003	0.0009
Proportion of academics attaining PBRF rank C(NE)		
Being on Benefit	0.0001	0.0003
Paid Employment	0.0000	0.0015
Further Study	0.0000	0.0008
Others/Unknown/Overseas	-0.0001	0.0014
Proportion of academics attaining PBRF rank R		
Being on Benefit	0.0007*	0.0003
Paid Employment	-0.0014	0.0017
Further Study	0.0007	0.0008
Others/Unknown/Overseas	0.0000	0.0017
Proportion of academics who did not submit Evidence Portfolio (EP) in the 2003 PBRF wave		
Being on Benefit	-0.0003	0.0003
Paid Employment	-0.0049***	0.0014
Further Study	0.0018**	0.0006
Others/Unknown/Overseas	0.0034**	0.0013
Department Level Characteristics		
Researcher's Position Title		
Proportion of Professors		
Being on Benefit	0.0006	0.0004
Paid Employment	-0.0008	0.0017
Further Study	0.0002	0.0008
Others/Unknown/Overseas	0.0000	0.0014
Proportion of Associate Professors		
Being on Benefit	0.0010**	0.0004
Paid Employment	0.0012	0.0014
Further Study	-0.0008	0.0007
Others/Unknown/Overseas	-0.0014	0.0013
Proportion of Lecturers		
Being on Benefit	0.0003	0.0003
Paid Employment	0.0014	0.0011

Further Study	0.0000	0.0006
Others/Unknown/Overseas	-0.0017	0.0010
Proportion of Other Teaching Staff		
Being on Benefit	-0.0002	0.0005
Paid Employment	0.0005	0.0019
Further Study	0.0007	0.0009
Others/Unknown/Overseas	-0.0009	0.0017
Proportion of Other Non-Teaching Staff		
Being on Benefit	0.0001	0.0003
Paid Employment	-0.0029*	0.0014
Further Study	0.0013*	0.0006
Others/Unknown/Overseas	0.0015	0.0013
Researcher's Gender		
Proportion of female academics		
Being on Benefit	0.0002	0.0002
Paid Employment	0.0005	0.0008
Further Study	-0.0004	0.0004
Others/Unknown/Overseas	-0.0003	0.0008
Proportion of academics for whom gender is unknown		
Being on Benefit	-0.0003	0.0005
Paid Employment	-0.0022	0.0016
Further Study	0.0027*	0.0011
Others/Unknown/Overseas	-0.0002	0.0013
Researcher's Age Band		
Proportion of academics in the age band of 20 to 29		
Being on Benefit	-0.0004	0.0009
Paid Employment	-0.0049	0.0038
Further Study	-0.0011	0.0019
Others/Unknown/Overseas	0.0064	0.0036
Proportion of academics in the age band of 40 to 49		
Being on Benefit	0.0001	0.0003
Paid Employment	-0.0003	0.0012
Further Study	0.0009	0.0008
Others/Unknown/Overseas	-0.0007	0.0010
Proportion of academics in the age band of 50 to 59		
Being on Benefit	0.0001	0.0003
Paid Employment	-0.0021	0.0012
Further Study	0.0015	0.0008
Others/Unknown/Overseas	0.0005	0.0011
Proportion of academics in the age band of 60 to 69		
Being on Benefit	0.0001	0.0004
Paid Employment	0.0020	0.0016
Further Study	0.0010	0.0008
Others/Unknown/Overseas	-0.0031*	0.0013
Proportion of academics in the age band of 70 and Over		

Being on Benefit	-0.0003	0.0009
Paid Employment	0.0014	0.0046
Further Study	0.0031	0.0021
Others/Unknown/Overseas	-0.0043	0.0039
Proportion of academics for whom age band is unknown		
Being on Benefit	0.0006	0.0004
Paid Employment	0.0016	0.0015
Further Study	-0.0012	0.0009
Others/Unknown/Overseas	-0.001	0.0011
Researcher's Ethnicity		
Proportion of Asian academics		
Being on Benefit	0.0000	0.0003
Paid Employment	0.0022	0.0013
Further Study	-0.0008	0.0007
Others/Unknown/Overseas	-0.0013	0.0011
Proportion of Māori academics		
Being on Benefit	-0.0002	0.0006
Paid Employment	-0.0065**	0.0024
Further Study	0.0041***	0.0012
Others/Unknown/Overseas	0.0027	0.0023
Proportion of Pasifika academics		
Being on Benefit	-0.0023	0.0013
Paid Employment	0.0094*	0.0047
Further Study	0.0014	0.0022
Others/Unknown/Overseas	-0.0085*	0.0042
Proportion of Middle Eastern/Latin American/African academics		
Being on Benefit	0.0012	0.0011
Paid Employment	-0.0019	0.0055
Further Study	0.0047	0.0025
Others/Unknown/Overseas	-0.0040	0.0060
Proportion of academics belonging to "other ethnicity"		
Being on Benefit	-0.0003	0.0002
Paid Employment	-0.0018	0.0014
Further Study	0.0013*	0.0006
Others/Unknown/Overseas	0.0009	0.0011
Proportion of academics for whom ethnicity is unknown		
Being on Benefit	-0.0003	0.0002
Paid Employment	-0.0008	0.0010
Further Study	0.0001	0.0006
Others/Unknown/Overseas	0.0009	0.0009

Student Level Characteristics

Student's gender

Female student		
Being on Benefit	-0.0132***	0.0038
Paid Employment	0.0170	0.0132
Further Study	-0.0221*	0.0088
Others/Unknown/Overseas	0.0183	0.0128
Student's high school decile		
School decile 1		
Being on Benefit	0.0162	0.0152
Paid Employment	0.1372*	0.0688
Further Study	0.0446	0.0387
Others/Unknown/Overseas	-0.1979*	0.0855
School decile 2		
Being on Benefit	0.0042	0.0134
Paid Employment	0.0142	0.0462
Further Study	0.0443	0.0284
Others/Unknown/Overseas	-0.0627	0.0411
School decile 3		
Being on Benefit	0.0011	0.0105
Paid Employment	0.0057	0.0520
Further Study	0.0491	0.0265
Others/Unknown/Overseas	-0.0559	0.0430
School decile 4		
Being on Benefit	-0.0045	0.0104
Paid Employment	0.0220	0.0468
Further Study	0.0441	0.0244
Others/Unknown/Overseas	-0.0615	0.0389
School decile 6		
Being on Benefit	-0.0094	0.0122
Paid Employment	-0.0266	0.0484
Further Study	0.0395	0.0255
Others/Unknown/Overseas	-0.0036	0.0422
School decile 7		
Being on Benefit	-0.009	0.0111
Paid Employment	-0.0778	0.0466
Further Study	0.0460	0.0245
Others/Unknown/Overseas	0.0408	0.0366
School decile 8		
Being on Benefit	0.0050	0.0096
Paid Employment	-0.0287	0.0428
Further Study	0.0396	0.0260
Others/Unknown/Overseas	-0.0159	0.0353
School decile 9		
Being on Benefit	0.0048	0.0097
Paid Employment	-0.0696	0.0426
Further Study	0.0490*	0.0221

Others/Unknown/Overseas	0.0157	0.0389
School decile 10		
Being on Benefit	-0.0062	0.0102
Paid Employment	-0.0581	0.0400
Further Study	0.0537*	0.0228
Others/Unknown/Overseas	0.0105	0.0366
School decile missing		
Being on Benefit	-0.4191***	0.0309
Paid Employment	0.0283	0.0897
Further Study	0.1298**	0.0419
Others/Unknown/Overseas	0.2610***	0.0709
Level of NCEA achieved by the student		
Achieved less than NCEA level 3		
Being on Benefit	0.0094*	0.0044
Paid Employment	-0.0272	0.0199
Further Study	0.0239*	0.0120
Others/Unknown/Overseas	-0.0061	0.0178
Overseas equivalent to NCEA level 3		
Being on Benefit	-0.0123	0.0101
Paid Employment	-0.0476	0.0268
Further Study	-0.0109	0.0157
Others/Unknown/Overseas	0.0709***	0.0200
Missing observations on NCEA level achieved		
Being on Benefit	-0.0188	0.0236
Paid Employment	-0.2100*	0.0971
Further Study	0.0792**	0.0307
Others/Unknown/Overseas	0.1496	0.0847
University fixed effects		
University 1		
University 2		
Being on Benefit	-0.0089	0.0237
Paid Employment	-0.3380***	0.0795
Further Study	0.0649	0.0723
Others/Unknown/Overseas	0.2820**	0.0941
University 3		
Being on Benefit	-0.0080	0.0130
Paid Employment	-0.0839	0.0483
Further Study	0.0758	0.0502
Others/Unknown/Overseas	0.0161	0.0450
University 4		
Being on Benefit	-0.0057	0.0103
Paid Employment	-0.0083	0.0485
Further Study	-0.0691*	0.0329
Others/Unknown/Overseas	0.0832*	0.0340
University 5		

Being on Benefit	-0.0097	0.0100
Paid Employment	-0.1164*	0.0490
Further Study	-0.0172	0.0370
Others/Unknown/Overseas	0.1433***	0.0430
University 6		
Being on Benefit	0.0285	0.0191
Paid Employment	-0.0766	0.0537
Further Study	-0.0057	0.0436
Others/Unknown/Overseas	0.0539	0.0409
University 7		
Being on Benefit	0.0031	0.0109
Paid Employment	-0.0787	0.0503
Further Study	-0.0600	0.0333
Others/Unknown/Overseas	0.1355***	0.0399
University 8		
Being on Benefit	-0.0051	0.0171
Paid Employment	0.0068	0.0642
Further Study	-0.0478	0.0489
Others/Unknown/Overseas	0.0461	0.0493
Subject area fixed effects		
Accounting and Finance		
Agriculture and Other Applied Biological Sciences		
Being on Benefit	0.0073	0.0246
Paid Employment	-0.0366	0.1025
Further Study	-0.0119	0.0301
Others/Unknown/Overseas	0.0412	0.0898
Anthropology and Archaeology		
Being on Benefit	0.0939	0.0757
Paid Employment	-0.0805	0.1692
Further Study	0.0333	0.0970
Others/Unknown/Overseas	-0.0467	0.0760
Architecture, Design, Planning, Surveying		
Being on Benefit	0.0442**	0.0172
Paid Employment	-0.1201	0.0620
Further Study	-0.0193	0.0207
Others/Unknown/Overseas	0.0952	0.0675
Biomedical		
Being on Benefit	0.0355	0.0487
Paid Employment	0.1540*	0.0752
Further Study	0.0202	0.0539
Others/Unknown/Overseas	-0.2097**	0.0680
Chemistry		
Being on Benefit	0.0599	0.0442
Paid Employment	-0.0470	0.0845
Further Study	0.1431*	0.0722

Others/Unknown/Overseas	-0.1560***	0.0483
Clinical Medicine		
Being on Benefit	-0.0148**	0.0050
Paid Employment	0.2977***	0.0326
Further Study	-0.0279	0.0226
Others/Unknown/Overseas	-0.2550***	0.0257
Communications, Journalism and Media Studies		
Being on Benefit	0.0341	0.0331
Paid Employment	-0.0395	0.0802
Further Study	0.0351	0.0482
Others/Unknown/Overseas	-0.0298	0.0584
Computer Science, Information Technology, Information Sciences		
Being on Benefit	0.0076	0.0083
Paid Employment	0.0209	0.0489
Further Study	-0.0046	0.0228
Others/Unknown/Overseas	-0.0240	0.0484
Dentistry		
Being on Benefit	0.0122	0.0116
Paid Employment	0.0247	0.0555
Further Study	-0.0437*	0.0178
Others/Unknown/Overseas	0.0069	0.0552
Design		
Being on Benefit	0.0577	0.0309
Paid Employment	-0.1634**	0.0612
Further Study	-0.0306	0.0201
Others/Unknown/Overseas	0.1363*	0.0618
Earth Sciences		
Being on Benefit	0.0153	0.0222
Paid Employment	-0.0040	0.0584
Further Study	0.0045	0.0357
Others/Unknown/Overseas	-0.0158	0.0611
Ecology, Evolution and Behaviour		
Being on Benefit	-0.0186***	0.0045
Paid Employment	0.2377**	0.0834
Further Study	-0.0132	0.0737
Others/Unknown/Overseas	-0.2058***	0.0489
Economics		
Being on Benefit	-0.0023	0.0113
Paid Employment	-0.1840***	0.0370
Further Study	0.1070***	0.0275
Others/Unknown/Overseas	0.0793*	0.0323
Education		
Being on Benefit	0.1261**	0.0461
Paid Employment	-0.0528	0.0766
Further Study	0.0029	0.0292
Others/Unknown/Overseas	-0.0762	0.0638

Engineering and Technology		
Being on Benefit	0.0818**	0.0304
Paid Employment	-0.0667	0.0548
Further Study	0.0282	0.0352
Others/Unknown/Overseas	-0.0433	0.0492
English Language and Literature		
Being on Benefit	0.0323	0.0276
Paid Employment	-0.1577*	0.0704
Further Study	0.0366	0.0377
Others/Unknown/Overseas	0.0887	0.0601
Foreign Languages and Linguistics		
Being on Benefit	-0.0006	0.0101
Paid Employment	-0.2322***	0.0466
Further Study	0.1058**	0.0351
Others/Unknown/Overseas	0.1269**	0.0450
History, History of Art, Classics and Curatorial Studies		
Being on Benefit	-0.0186***	0.0045
Paid Employment	-0.0276	0.0772
Further Study	-0.0113	0.0377
Others/Unknown/Overseas	0.0576	0.0646
Human Geography		
Being on Benefit	-0.0186***	0.0045
Paid Employment	-0.4485***	0.0627
Further Study	0.4539	0.3004
Others/Unknown/Overseas	0.0133	0.3445
Law		
Being on Benefit	0.0195	0.0134
Paid Employment	-0.0092	0.0481
Further Study	0.0767*	0.0305
Others/Unknown/Overseas	-0.0870*	0.0376
Management, Human Resources, Industrial Relations, International Business and Other Business		
Being on Benefit	0.0044	0.0079
Paid Employment	-0.0582	0.0381
Further Study	-0.0202	0.0202
Others/Unknown/Overseas	0.0740*	0.0333
Marketing and Tourism		
Being on Benefit	0.0020	0.0086
Paid Employment	-0.0629	0.0364
Further Study	-0.0029	0.0260
Others/Unknown/Overseas	0.0637	0.0356
Molecular, Cellular and Whole Organism Biology		
Being on Benefit	0.0223	0.0244
Paid Employment	-0.1269	0.0674
Further Study	0.0514	0.0399
Others/Unknown/Overseas	0.0531	0.0656

Music, Literary Arts and Other Arts		
Being on Benefit	0.0810*	0.0359
Paid Employment	-0.2375***	0.0722
Further Study	0.0846	0.0511
Others/Unknown/Overseas	0.0719	0.0628
Other Health Studies (including Rehabilitation Therapies)		
Being on Benefit	0.0109	0.0096
Paid Employment	0.1555***	0.0446
Further Study	-0.0275	0.0216
Others/Unknown/Overseas	-0.1389***	0.0380
Philosophy		
Being on Benefit	0.0244	0.0333
Paid Employment	-0.2323**	0.0855
Further Study	0.1383	0.0726
Others/Unknown/Overseas	0.0697	0.0550
Physics		
Being on Benefit	0.0770*	0.0321
Paid Employment	-0.1933	0.1166
Further Study	0.1220	0.0676
Others/Unknown/Overseas	-0.0056	0.0816
Political Science, International Relations and Public Policy		
Being on Benefit	0.0428	0.0258
Paid Employment	-0.0085	0.0776
Further Study	0.0347	0.0459
Others/Unknown/Overseas	-0.069	0.0492
Psychology		
Being on Benefit	0.0358	0.0197
Paid Employment	-0.0591	0.0531
Further Study	0.1129**	0.0415
Others/Unknown/Overseas	-0.0896*	0.0442
Public Health		
Being on Benefit	0.0344	0.0328
Paid Employment	-0.1868*	0.0909
Further Study	-0.0054	0.0337
Others/Unknown/Overseas	0.1579	0.0881
Pure and Applied Mathematics		
Being on Benefit	0.0112	0.0122
Paid Employment	-0.1783***	0.0485
Further Study	0.0623	0.0584
Others/Unknown/Overseas	0.1048*	0.0459
Religious Studies and Theology		
Being on Benefit	0.1066	0.1371
Paid Employment	-0.0756	0.1028
Further Study	-0.0767***	0.0159
Others/Unknown/Overseas	0.0457	0.1023

Sociology, Social Policy, Social Work, Criminology and Gender Studies		
Being on Benefit	0.0516	0.0370
Paid Employment	-0.0994	0.0670
Further Study	0.0790	0.0506
Others/Unknown/Overseas	-0.0312	0.0511
Sport and Exercise Science		
Being on Benefit	-0.0186***	0.0045
Paid Employment	0.2992***	0.0548
Further Study	-0.0659**	0.0212
Others/Unknown/Overseas	-0.2146***	0.0531
Statistics		
Being on Benefit	0.0048	0.0097
Paid Employment	-0.2793***	0.0408
Further Study	0.2076***	0.0430
Others/Unknown/Overseas	0.0670	0.0558
Theatre and Dance, Film and Television and Multimedia		
Being on Benefit	0.1125	0.1265
Paid Employment	-0.5463***	0.0639
Further Study	0.3932*	0.1842
Others/Unknown/Overseas	0.0407	0.1918
Veterinary Studies and Large Animal Science		
Being on Benefit	-0.0186***	0.0045
Paid Employment	0.0800	0.0625
Further Study	-0.0767***	0.0159
Others/Unknown/Overseas	0.0153	0.0600
Visual Arts and Crafts		
Being on Benefit	0.0441	0.0292
Paid Employment	-0.1941**	0.0712
Further Study	0.0207	0.0506
Others/Unknown/Overseas	0.1294*	0.0641
Year fixed effects		
First year at the tertiary education institute of the student – 1999		
Being on Benefit	-0.0059	0.0072
Paid Employment	-0.0274	0.0316
Further Study	-0.0531**	0.0180
Others/Unknown/Overseas	0.0864*	0.0365
First year at the tertiary education institute of the student – 2007		
Being on Benefit	-0.0403**	0.0155
Paid Employment	-0.1911**	0.0669
Further Study	-0.0414	0.0313
Others/Unknown/Overseas	0.2728***	0.0680
First year at the tertiary education institute of the student – 2008		
Being on Benefit	-0.0395**	0.0152
Paid Employment	-0.1473*	0.0668

Further Study	-0.0528	0.0315
Others/Unknown/Overseas	0.2396***	0.0682
Number of observations	6,258	

Notes: (1) The dependent variable is the *labour market status* of the student. (2) Robust standard errors are clustered on the *id* (*id* is composed of evaluation year, university, and subject area) level. Standard error adjusted for 340 clusters in id. (3) The base outcome variable is percentage of academics scoring grade C for PBRF outcomes, percentage of senior lecturers for researcher's position title, percentage of male academics for researcher's gender, percentage of academics in the age band 30 to 39 for researcher's age band, percentage of NZ Europeans/ Pākehā academics for researcher's ethnicity. (4) The base outcome variable is male student for student's gender, European/ Pākehā student for student's ethnicity, school decile 5 for student's school decile, NCEA level 3 achieved for level of NCEA achieved by the student. (5) I have estimated all the above coefficients by using university, subject area, and year fixed effects. (6) I am not allowed to identify specific universities due to 5.14.2 entity clause of Stats NZ. (7) * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$.

CHAPTER FIVE

Conclusion

In my thesis, I undertake three studies to shed light on the effect of university departments' research activity on the outcomes of university students. Academics, policy makers, researchers and students have long been intrigued by the relationship between research and teaching – whether it exists and if it does, what direction and magnitude it might be. Despite a large number of studies dedicated to this topic, both theory and evidence suggest that the existence, direction, or size of this link unclear. My research tries to address gaps in the existing studies and to better inform policymakers about how to structure (and fund) tertiary education.

In an attempt to contribute to the literature, I further investigate the link between research and teaching performance. I study both short-term (students' university achievement in Chapter-2 and student evaluations of their teachers in Chapter-3) and medium-term (students' labour market outcomes in Chapter-4) impacts of research on teaching. A novel feature of my research is that I use a rich, national, individual-level dataset on all undergraduate students in New Zealand universities (in Chapters-2 and 4) in contrast with the existing literature which focuses only on a single or few departments/universities.

In Chapter-2, I study the impact of research activity of academics on university achievement of students as measured by their course *pass rates*. My results suggest that research performance seems to have no economically or statistically significant impact on the *pass rates* of undergraduate students. These findings are reinforced in Chapter-3 where I examine the effect of academics' research performance on student evaluations of teaching quality in a single department at a large New Zealand university. The main finding is further confirmed in Chapter-4 where I test this potential effect on students' medium-term outcomes in terms of labour market status/destinations.

There are several competing hypotheses that are consistent with my findings. The first is that research-active academics could affect undergraduate student outcomes, but they are disproportionately involved in teaching and supervising postgraduate students. A second reason could be that research-active academics could in principle affect undergraduate student outcomes, if they spent the same time teaching them as less research-active academics. However, research-active academics may in general be spending a disproportionately higher amount of time on research rather than teaching. A third hypothesis is that the traits required for success in research are largely independent for those required for success in teaching.

While the dataset I use is detailed and large, one potential weakness is that the PBRF scoring system is complex and does not provide a 'clean' measure to assess all the research activities of academics. Another drawback imposed by data availibility is that I can only study relatively crude *pass rates* and not finer measures of learning performance such as a student's GPA. I am also aware that *pass rates* are not an absolute measure of students' performance – they are a combination of performance as well as lecturers' expectations. More research-active departments might have harsher standards to pass students as compared to less research-active departments - but they might also attract better students which could counter this. Student evaluations could also suffer from a similar limitation – it might be argued that it is more difficult to get high teaching evaluation scores for academics who have high marking standards. However, the fact that I also find no effect for arguably objective and exogenous measures of labour market placement (Chapter-4) reinforces my conclusion.

A worthwhile extension of this study would be to examine the impact of research performance of academics on post-graduate student outcomes where it might be more likely to witness a positive impact. Another possible extension could be estimating this effect using the Heckman procedure to investigate the impact of research-active departments on students' later earnings. However, a challenge of this exercise is being able to find a suitable 'identifying' variable which predicts employment status but does not directly predict earnings in the New Zealand context.

Notwithstanding the limitations stated above, the major findings of all my chapters point in the same direction. Overall, I find an economically and statistically insignificant effect of academics' research performance on both immediate and medium-term undergraduate students' outcomes. No matter how I test this relationship, whether through more objective or more subjective measures (perceived learning and overall wellbeing of students themselves), the findings remain the same. This result reflects the conflicting influences of research activity on teaching and is consistent with my expectation.

If less active researchers do not deliver lower-quality teaching as tentatively suggested in this thesis, New Zealand universities could perhaps consider a degree of separation of teaching from research and allow for a range of academic roles – some consisting of heavier teaching and lighter research expectations, others of lighter teaching and higher research expectations; that is, more specialisation. In a similar vein, universities could reassess their hiring requirements and consider accepting academics with a lower research experience for teaching-intensive positions and also change promotion criteria and academic tracks. This practice is not uncommon in other developed countries but has been rare in New Zealand. Finally, it is important that prospective undergraduate students and whānau obtain information directly about the teaching quality in a particular department – in addition to various statistics/rankings which may highly depend on research.

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